Hawkesbury City Council

attachment 3
to
item 257

State of
Environment Report

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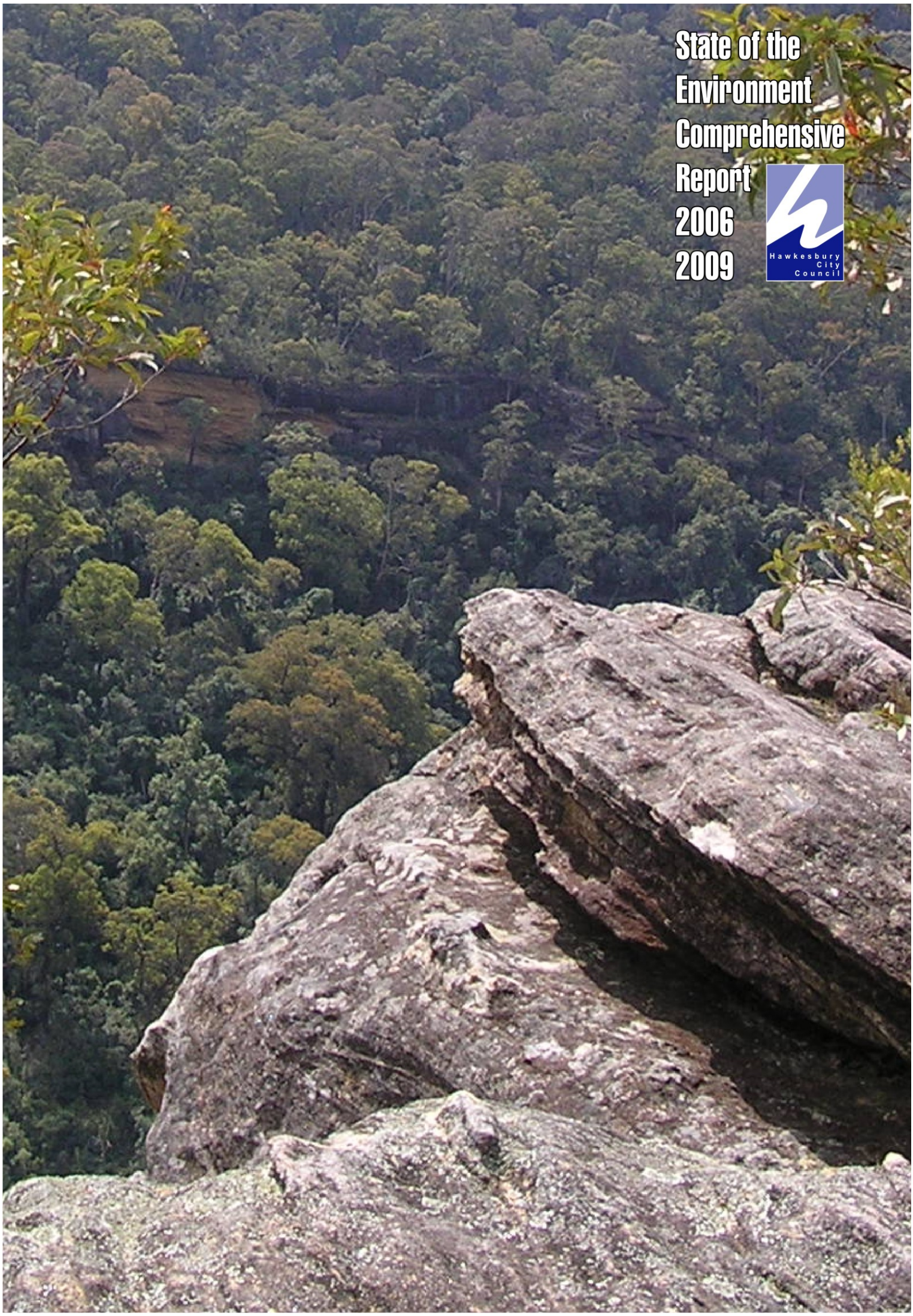
time: 6:30 p.m.



State of the Environment Comprehensive Report 2006 2009

Hawkesbury City Council

Hawkesbury City Council

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Table of Contents

HAWKESBURY CITY COUNCIL

Table of Contents

About this Plan

HAWKESBURY CITY COUNCIL

Local governments are currently required to prepare a comprehensive four year State of the Environment (SOE) report with annual updates. Comprehensive reports are due the year following Councillor elections are held.

A new planning and reporting framework for NSW local government has been introduced. These reforms replace the former Management Plan and Social Plan with an integrated framework. It also includes a new requirement to prepare a long term Community Strategic Plan and Resourcing Strategy.

The new system shifts the focus away from reporting on prescribed themes and moves the emphasis towards adequately informing long term planning.

The requirement for councils to prepare a SOE Report has been maintained. The legislative requirements have been amended to provide councils with the flexibility to prepare their SOE Report in a way that enables councils to focus their resources on monitoring and reporting on environment issues that are of concern to their community and where council may influence their management.

In response to engaging the community, Hawkesbury City Council has adopted their 20 year Community Strategic Plan. The information obtained from the SOE has been used to inform the preparation of the Community Strategic Plan and continue to inform the required reviews of the Community Strategic Plan. Over time the SOE has been modified to ensure appropriate environmental indicators have been established to determine if Council is achieving the environmental objectives in their Community Strategic Plan. Council can use previous SOE Reports to enable trends to be monitored over time, but critically review the current monitoring system to ensure that it is integrated and relevant to achieve long term environmental objectives.

Councils must consult with their community and in particular, environmental groups in their area. Council's response to this situation was to develop an Environmental Network Group. Inviting all environmental groups to meet regularly to discuss what is happening in the community and most importantly, provide Council with information to assist with the development of the SOE. It also provides an opportunity for Council to educate the community, clarify the roles and responsibilities and raise environmental awareness while formulating partnerships.

The SOE report is based on quantifiable performance data, which is drawn from data collected and managed by Council. This data is managed by Planet Footprint. Planet Footprint is an environmental scorekeeper and provides a managed service that is on demand, independent and provides transparency.

Each report summarises the State of the Environment of Hawkesbury City in a series of 'Report Cards'. Each report card represents an environmental issue relevant to the community and Council activities. Each report card includes the following information.

- Introduction
- Measures of performance - targets set by Council
- Current status and trends - trend over time of the leasing stale indicator
- Response to the issue - information about the main Council response to alleviate pressures
- Future directions

It is anticipated that Council will produce a refined set of targets in future years integrated with the Community Strategic Plan.

Hawkesbury City Council is working in conjunction with Planet Footprint to launch an online portal system that will be available to the public on demand 24 hours a day, seven days a week. It is anticipated to be launched by the end of 2009 at www.planetfootprint.com.

Sustainability Planning

Introduction

Local Government has a responsibility to contribute to a more sustainable future, along with other spheres of government, corporations, community organisations and individual householders. In essence a healthy Council is that which cares for community and environmental assets, is accountable, uses resources wisely, engages its community in decision- making and planning, is resilient, sustainable and forward looking.

"Ecological sustainable development (ESD) means using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained and the total quality of life, now and in the future, can be increased".

However this meaning has been refined to a general agreement on the meaning of sustainability for the Hawkesbury that involves:

- Living within the limits posed by the physical world
- Understanding the interconnections among economy, society and environment
- Equitable distribution of resources and opportunities

The ultimate aim is to arrive at a system where, through a process of examining past results, complemented by objective risk assessment, you can easily see what the issues of most significance are that will require greater focus and allocation of resources.

Measures of Performance

Measures of performance can be checked by using the NSW Local Government Sustainability Health Check.

The Sustainability Health Check is a manual and set of worksheets for councils to use in reflecting on how well sustainability concepts and practices are being implemented across the organisation. This review process is used by several NSW state agencies and is one of the preferred assessment methods contained in the Planning and Reporting Guidelines for local government in NSW (2009).

This enables council to evaluate:

- Governance issues eg are we reflecting our principles?
- Identifying risk, assessing gaps in performance and process
- Demonstrate the use of sustainability principles
- Planning and review the status of the organisation
- Continuous improvement eg Are we moving towards achieving our long term objectives?

Current status and trends

On the 16 March 2007, Hawkesbury City Council was awarded an Urban Sustainability Seed Funding grant of $20,000 from the NSW Environmental Trust. Council used these funds to engage the Institute for Sustainable Futures- UTS (ISF), to assist with the preparation of a sustainability strategy.

The general aims of the project were to:

- Assess the current situation with regard to sustainability planning – including the identification of any gaps in Council's approach to addressing sustainability
- Identify opportunities to integrate sustainability into Council's governance framework and planning processes
- Embed the community's vision into Council's approach to sustainability
- Increase the understanding of and commitment to sustainability (as a holistic framework with environmental, social and economic dimensions) among Council staff and Councillor's
- Develop a strategic approach to sustainability, to guide and inform Council planning processes over the longer term.

To meet these objectives, ISF worked both independently and in collaboration with Council's City Planning Strategic Team to assess the current situation of Hawkesbury City Council, and to understand the sustainability challenges and opportunities that it faces.

Response to the issue

Council staff identified the key strategic documents that may relate to sustainability throughout the organisation and reflected on their usage and status. ISF then modified aspects of the NSW Local Government Health Check to use as a diagnostic framework for the organisation. This was then applied in the first workshop, with planning and building assessment staff, to assess characteristics of organisational systems and strategic planning at Hawkesbury City Council. This included an introduction to sustainability concepts (training) and a facilitated staff reflection on issues and potential strategies.

The review was completed in November 2007 and the following outlines some key features.

All groups agreed that the management plan and major corporate policies had partial inclusion of sustainability principles in them but all agreed that budget bids and plans were not integrated with sustainability principles, concepts, or considerations.

Challenges identified some documents are clear, some not clear at all and there was a lack of clarity around sustainability principles and therefore haphazard links to sustainability. Lack of integration in documents and lack of monitoring was also cited as a challenge.

Internal reporting was considered to have the least integration of sustainability concepts and considerations. Reports to meetings, and annual reporting, were deemed to have none or partial inclusion of sustainability. It was identified that the State of the Environment Reporting integrated sustainability concepts, however, it was thought it only partially did so, noting that economic factors are not included in the SOE, but included in the Annual Report.

HAWKESBURY CITY COUNCIL

Council at its meeting dated 29 April 2008 adopted the following:

"That the:

1. *Final Report "Sustainability Planning for Hawkesbury City Council" be endorsed as a guide to inform Council's planning and strategy review.*

2. *Principles and Objectives contained in the final Report "Sustainability Planning for Hawkesbury City Council" not be used separately or out of context, but be refined as part of the process of integrating sustainability into Council's governance framework and planning processes."*

In summary the report contained:

- A series of **sustainability principles**. These are based on leading-edge thinking about sustainability, and can be used to guide the high-level strategic approach to sustainability at Hawkesbury City Council. These principles would also function as a 'check' on planning and decision-making by assisting in determining which option will most effectively implement the sustainability aims of the Council and the community.

  Principle 1: The extraction and use of non-renewable resources should be slowed down, and sustainable production and consumption promoted.

  Principle 2: Cyclical rather than linear systems should be adopted, to prevent the accumulation of waste materials.

  Principle 3: The productivity and diversity of nature must be protected and maintained.

  Principle 4: Use of energy and other resources must be just and efficient, both across the globe and between generations.

  Principle 5: Even if there is doubt about the environment impact that an action will have, one should err on the side of caution to protect the environment.

  Principle 6: Expand and enable cooperative networks to work towards a common, sustainable future.

  Principle 7: Educate and empower people and foster participation.

  Principle 8: Continual improvement will be enabled, based on accountability, transparency and good governance.

- A number of **sustainability objectives** for Hawkesbury City Council to work towards.

- Suggested **strategic directions** for Hawkesbury City Council. With reference to the sustainability principles and to the particular challenges and opportunities facing Hawkesbury City Council, a series of suggested directions is provided as a guide to demonstrate a variety of approaches that Council might take in working towards the sustainability objectives.

- A range of **implementation examples**. These are specific actions that could be taken under each of the strategic directions. The implementation examples are suggestions only and are not intended to be actions for adoption by Council – there are numerous other actions that could be taken in support of a given strategic direction that would be developed by Council when required.

The principles, objectives and directions in the report were designed to assist in focusing the preparation, or review, of future Council strategic documents and the day to day operational functions of Council. The recommendations of the report can be used as a guide in the short term and ultimately as a basis for the preparation of a more detailed sustainability strategy.

Future directions

Sustainability planning for Hawkesbury City Council means embarking on a formal strategic planning exercise, such as facilitating the process of developing a long range community strategic plan. This results in a clear articulated vision with objectives, targets and actions for the whole local government area.

Developing an understanding of the community's vision for the future of the Local Government Area is a critical task that should provide context for, and directly inform the strategic approach to sustainability that Hawkesbury City Council has now begun to develop.

Council has recently initiated a community engagement process as the first stage in developing a 20 year Community Strategic Plan.

It is important to acknowledge the various "spheres of interest" that operate for a local Council. Some issues are within a Council's "control", others are issues that a Council may seek to influence, while still others are issues that a Council will be concerned about, but not necessarily able to influence. All these levels are relevant to the development of a strategic approach to sustainability.

For example, Councils can act as:

- A leader and custodian, demonstrating sustainability in action and practice
- A change agent, through education, policy, plans and new processes
- A responsive entity, responding to community aspirations, needs and concerns.

In local government, ensuring that sustainability strategies and long term action is embedded means ensuring that it is recognised in the key plans, and in particular in the Management Plan or Delivery Plan which is the basis on which resources, including finances, are allocated.

Sustainability Staff Workshop

Integration with Hawkesbury Community Strategic Plan 2010-2030

Introduction

Council has developed a "Hawkesbury Community Strategic Plan". This document highlights what the community has told Council it would like to see the Hawkesbury look like by 2030.

The draft Plan was developed in consultation with the community, Councillors and council staff and will provide essential direction for future Council activities and decision-making.

Community Strategic Plan- Community Forum North Richmond

The plan supports the NSW State Planning priorities, guides Council's strategic planning processes and incorporates the Department of Local Government's social, economic, environmental and governance strategic principles.

The plan is divided into five elements. For each element a Vision Statement describes a concise community aspiration.

Directions, Strategies, Goals and Measures are provided for each element to assist Council and the community in achieving its vision.

- The Directions provides a further expansion of the intent of the Vision Statement
- Strategies identify how we will aim to deliver what has been requested
- The Goals identify targets that must be achieved in order to reach the vision
- Measures outline key performance guides that will identify if we are on the right track

Measures of Performance

The Hawkesbury Strategic Plan includes milestones which describe what Council will do in the short term (4 years) to deliver the strategies identified.

How Council will complete these milestones will be contained in Council's Annual Management Plan and will be the conduit through which the Plan's directions and strategies will be implemented. Budgets and services provided by Council will be allocated in more detail through this annual process.

Progress towards achieving the goals and measures will be routinely monitored and reported to the community.

Current status and trends

What is clear from our consultations so far is that the Hawkesbury area is cherished by its community. We admit we are faced with many challenges, but see the opportunity to work together to respond to these issues, capitalise on the beautiful area in which we live.

This plan will be reviewed following the next council election and thereafter every four years inline with the cycle of local government elections.

The plan belongs to the people of the Hawkesbury and the implementation will require the cooperation and commitment of many sectors including government, business and the general community.

Response to the issue

A set of eight sustainability principles have been embedded into the Strategic Plan. This set of principles has been developed with reference to various existing and well known sets of sustainability principles, including the system conditions of the "Natural Step" approach, the "Melbourne Principles for Sustainability Cities", developed by the United Nations Environment Programs, and the principles contained in the UNCED "Rio Declaration"

Strategic objectives have been specifically designed for the Hawkesbury needs based on Council's own documents and the workshops undertaken with Council staff.

Key challenges include limited budgets and the need for practical, readily applicable tools, checklists and materials for the ongoing work of sustainability planning and program development.

The objectives can be seen as a series of high level goals that Council is working towards.

Objective 1: Council builds and maintains local partnerships for sustainability.

Objective 2: Sustainability practices are built into Council's existing operations.

Objective 3: Sustainability practices are integrated into Council's existing plans.

Objective 4: Council staff and Councillors understand and are committed to sustainability.

Objective 5: Council engages and supports people in the community to work towards sustainability.

Objective 6: Council secures resources and makes them available to deliver good sustainability outcomes.

Objective 7: Sustainability objectives and achievements are communicated.

Future directions

In local government, ensuring that sustainability strategies and long term actions are embedded means ensuring that it is recognised in the key plans, and in particular in the Management Plan, which is the basis on which resources, including finances, are allocated.

For Planning staff, this implies thinking about planning cycles for important documents and identifying the crucial points for making sure that strategies are adopted and action plans committed to. This can be achieved internally through establishing interdepartmental project teams for set periods of time, recruiting internal champions for the issue at different levels of the organisation, including management and operational staff. New programs or changes to existing programs can be linked to training opportunities or career development for staff.

Externally, formal commitments and strategies are achieved through formal resolutions of Council and can be reaffirmed through public gestures of political commitment to the program. Once endorsed through public participation, it is crucial to continue informing the community of progress. This requires regular reporting on the progress of change,

The components of the framework and how they fit together
(Source: Planning and reporting manual for Local Government in NSW 2009)

It is easy to underestimate the patience and effort required to see a change through from idea to implementation to maintenance.

Being realistic about what you can achieve, what support you need, and the challenges of your own capacity at various times may help you prioritise projects. When making decisions about actions, a clear set of decision-making criteria should be used. The following is a list of suggested considerations:

Social – cultural:

- Social - will this activity provide benefits to the community of Hawkesbury? Does it address a community priority?
- Individual - Is there a staff member willing to take the lead on advancing this action, and are there people available to support them? Will it provide them with useful professional skills and experience?
- Organisational - Will this activity contribute positively to the overall work experience of staff across the organisation- or at least not have a negative impact?

Ecological

- Will this activity contribute positively, or at least do no harm, to the natural assets of Hawkesbury?
- Will this activity increase consideration of the ecological impacts of Council's activities, and encourage people to avoid them?
- Will this activity help Council reduce resource use and increase efficiency.

Economic

- Can this activity be done within existing budgets? If not, can a "highly likely" funding source be identified?
- Will this activity require any ongoing inputs of funds? Have the long term financial implications of this activity been considered and planned for?

Governance

- Will this activity have another benefit to Council?
- Can it be done through existing avenues or in response to existing stated needs? eg two birds with one stone
- Will this action increase Council's reputation and standing in the local community?

The Draft "Hawkesbury Community Strategic Plan", was developed in consultation with the community, Councillors and council staff and will provide essential direction for future Council activities and decision making.

Once the strategies have been endorsed through public participation and adopted by Council, it is crucial to continue informing the community of progress. This requires regular reporting back on the progress of change, and can be achieved through newsletters, annual reports, "scorecards" and Council's website as described by Council's engagement strategy.

Population and Settlement Patterns

Introduction

The Hawkesbury LGA is located 55 kilometres north-west of Sydney CBD within the Hawkesbury River Valley. The area is divided by five rivers. Approximately 70% of the LGA is covered by national parks.

The Hawkesbury has an area of 2,793 square kilometres is the largest LGA area in the Sydney basin with an estimated population of 62,825.

Hawkesbury was settled by Europeans over 200 years ago and was one of the earliest areas to be settled after Governor Phillip's arrival, in 1789. In 1794, 22 farms were marked out from South Creek to Wilberforce and, within four years, the area was populated with 600 free settlers as well as convict labourers. In 1810, Governor Macquarie established five towns in the area – Windsor, Richmond, Wilberforce, Pitt Town and Castlereagh.

Prior to European settlement, the Hawkesbury's inhabitants were the Darug tribe of Aboriginal origin.

The topography of the area is diverse ranging from fertile flood plains and wetlands, to undulating hills and heavily timbered ridges, through to inaccessible mountainous regions dissected by steep gorges and towering escarpments. As a result of these geographic features, the Hawkesbury experiences regular flooding and bushfires, often resulting in disruption to commerce and damage to agriculture, property and community infrastructure. These features also limit development within the City.
The Hawkesbury area has an estimated resident population (ERP) of 62,828 people (ABS ERP - September 2009).

The over-all picture of settlement patterns continually growing across the Hawkesbury area, but at a much slower rate of growth than in the past. The growth is also uneven (see Table 2 below) across Hawkesbury localities. Some older and established urban areas (Windsor, Windsor Downs, Richmond and Bligh Park) are showing a slight decline; at the same time some urban and semi-rural areas are showing continued and projected growth (North Richmond and Pitt Town). A few rural areas with small current populations will experience substantial growth as part of the State Government's plans for the North-West Growth Sector (including Vineyard and parts of Oakville).

A comparison of Hawkesbury's profile and population with the wider region of Western Sydney can be found on WSROC's website - www.wsroc.com.au (under 'Regional Profile' by Informed Decisions) - select 'Hawkesbury' for area comparison.

Measures of Performance

Population figures and projections are based on the Australian Bureau of Statistic (ABS) Census of Population & Housing (1991,1996,2001 & 2006).

Current Status and Trends

While the Hawkesbury's population remained relatively static between 2001-2006 it is expected to grow at approximately 0.75% annually over the next 20 years. This is a slower annual rate of growth than we have seen in the last 20+ years: 2.2% p.a. between 1991-1996, which declined to 1.5% annual growth between 1996-2001).

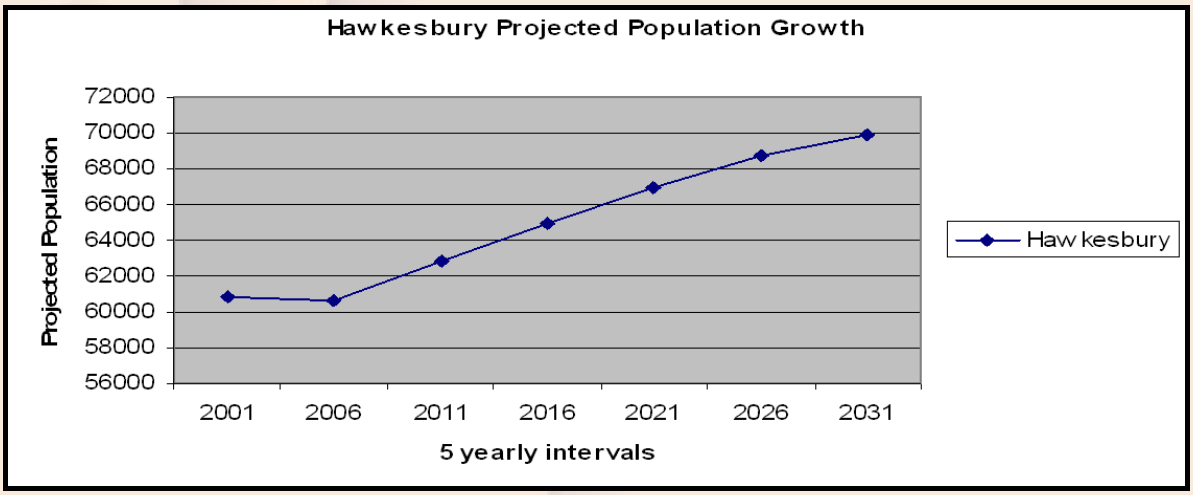


Table 1 This table shows Hawkesbury's total projected population growth to 2031.

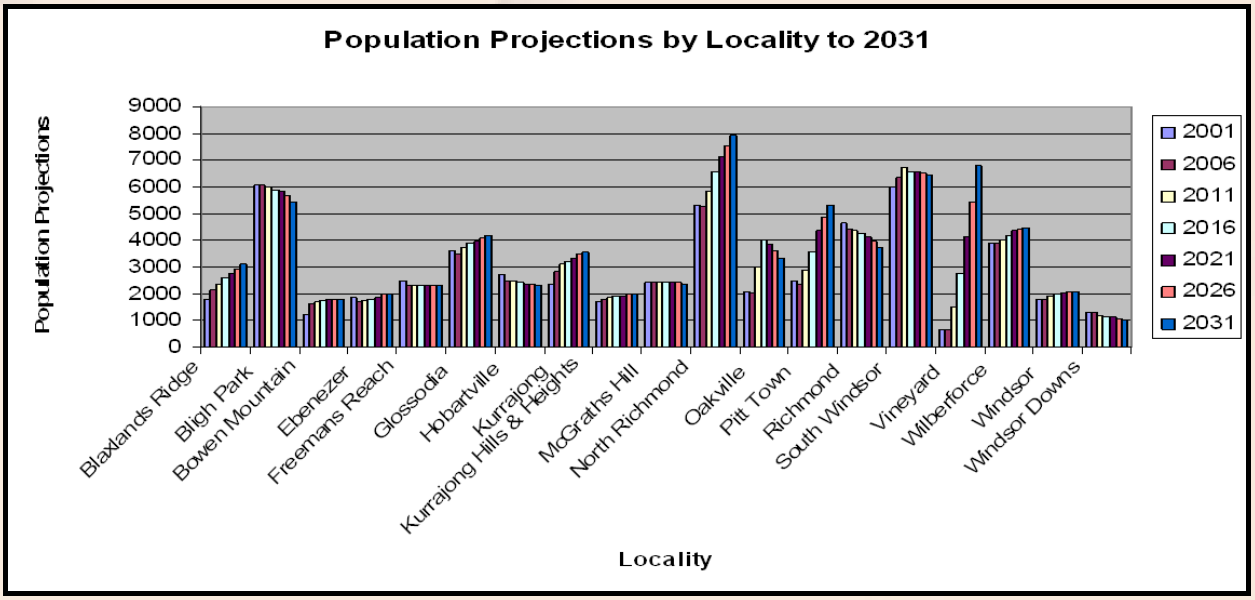
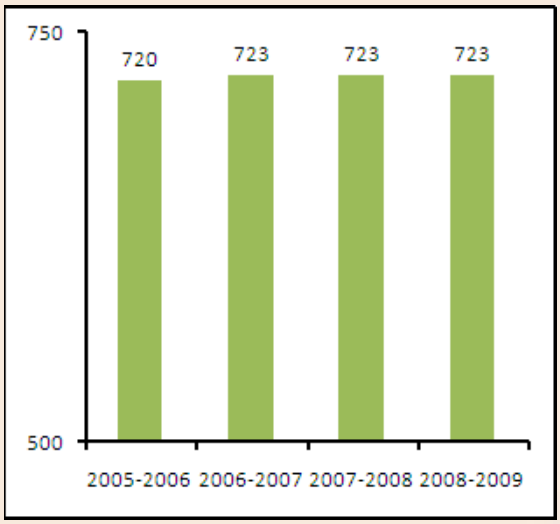


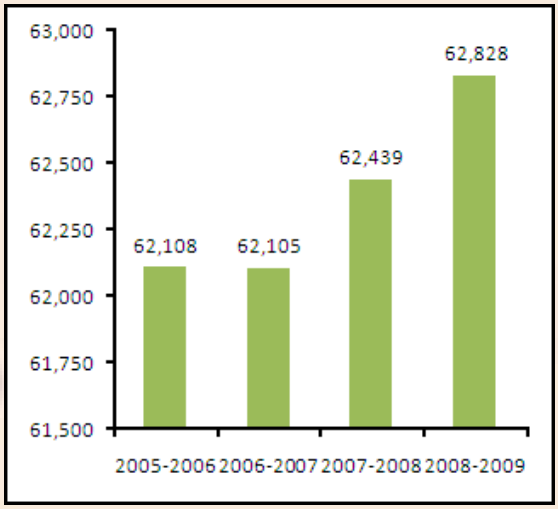
Table 2 This table shows population projections to 2031 for key localities across the Hawkesbury (Data for Tables 1and 2 produced by Census Applications 2008 based on ABS data).

Note: Population projects are only a guide to possible future growth and should be used with care. They are based on past population growth, current birth rates, potential future growth areas and other variables.

General Indicators

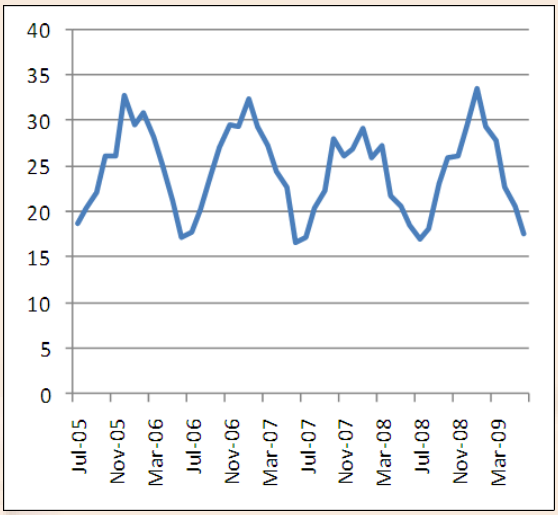


Length of sealed roads in the City (kms)



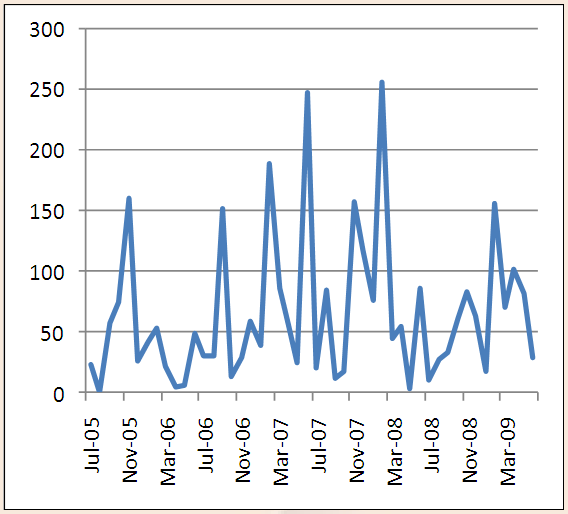
Population of the City

Hawkesbury City Council Local Government Area contains 62,828 people. Where the population is widely spread over 2,793 square kilometres, Council maintains 723 kilometres of sealed road over 300 kilometres of unsealed road. The Hawkesbury area is the largest in area within the Sydney basin and the highest roads per capita to maintain.



Average monthly maximum temperate for the City (°C)
(taken from meteorological station at Windsor)

In 2005 the temperatures peaked in the summer months and traditionally dropped in the winter months. However from 2006 the hotter temperatures are enduring for longer periods of time eg traditional summer temperatures are now creeping into spring and autumn.



Monthly rainfall for the City (mm)
(taken from meteorological station at Windsor)

Little rain fell over the Hawkesbury catchment from November 2005 - 2006. Large events occurred in 2007, with a noticeable decrease again in 2008.

Sewage Treatment Plants

Introduction

Hawkesbury City Council and Sydney Water are responsible for the delivery of sewage treatment and associated infrastructure within the Hawkesbury City Local Government Area. The major pressure facing Council in delivering adequate treatment services is population growth and the need to ensure treatment infrastructure is maintained and expanded to cope with the increasing treatment requirements.

Approximately 80% of the residential areas are sewered by the two authorities with the remaining premises being serviced by sewage management facilities.

Both McGrath's Hill and South Windsor treatment plants are owned and operated by Hawkesbury City Council.

Measures of Performance

Measure

1. Total volume of sewerage treated per resident per day.
2. Proportion of sewerage treated that is recycled.

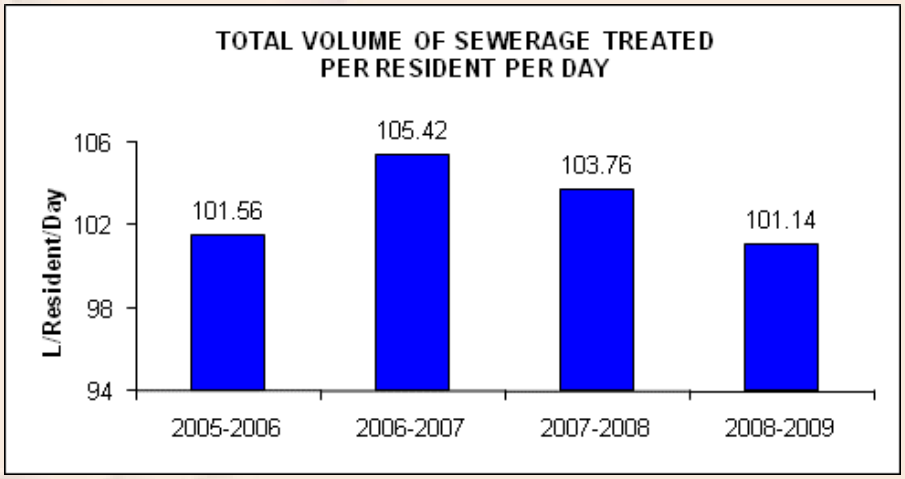
How is the Hawkesbury performing?

The proportion of treated sewerage that is recycled (and therefore not discharged to waterways) has increased between 2007-2008 and 2008-2009.

Current status and trends

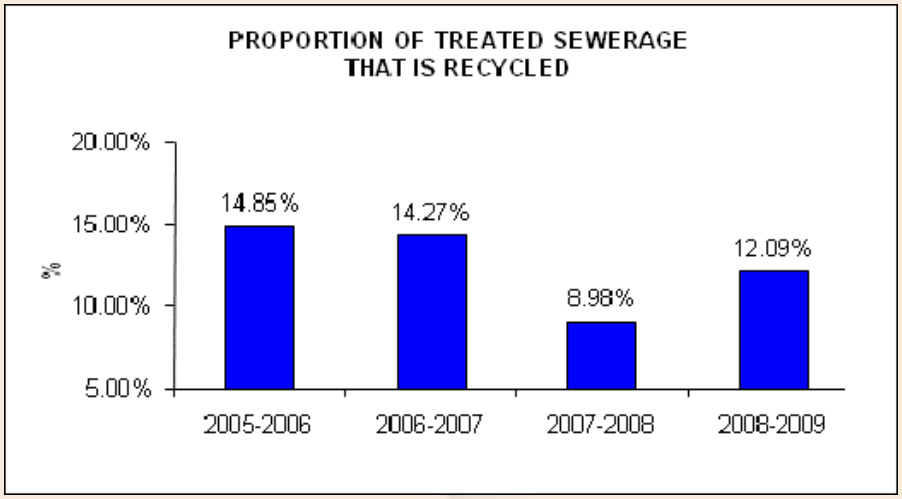
There are approximately 7,580 active connections being serviced by the two treatment plants. Of those connections serviced by a reticulated sewerage system, approximately 32% of the wastewater is treated at the McGrath's Hill plant; the remainder is treated at the South Windsor plant.

There are approximately 1,934 domestic and 60 non-domestic pump-out sullage services that are collected by tanker trucks and delivered to the South Windsor treatment plant.



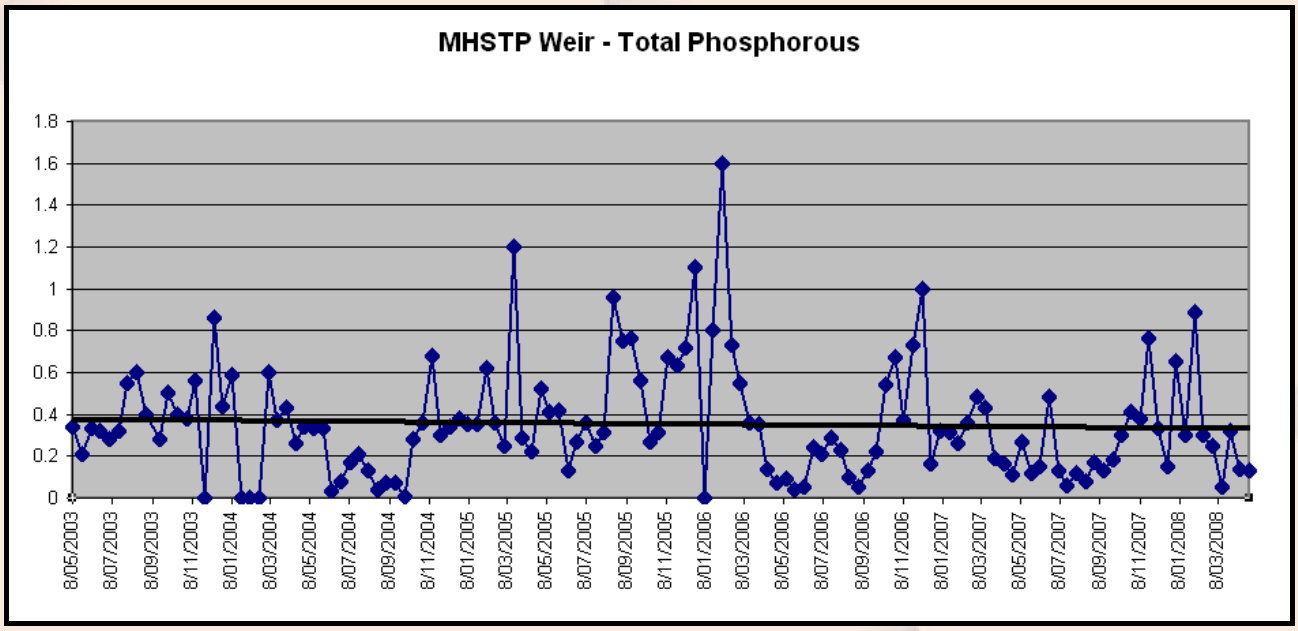
Outcome 1

This value is much higher than last year because the total volume of treated sewage from McGrath's Hill and South Windsor treatment plants was divided by the population of the local government area and not just the properties connected to the treatment plants.



Outcome 2

Proportion of treated sewage that is recycled for 2008-09 is 12%.



As can be seen from the above graph there has been a general decline in the concentrations of phosphorous entering the receiving waters. Fish and aquatic microphytes will benefit with the improvement of water quality.

Response to the issue

Council is working to improve the management of aqueous waste in the Hawkesbury through a number of activities and initiatives including:

- Continuing to investigate and improve on effluent reuse. Normally 40 to 50% of the effluent from McGrath's Hill treatment plant is used to irrigate a red river gum, swamp mahogany forest and benefit crops such as Lucerne and rye grass. Due to a wetter than usual 2008-09 summer only 37% of the effluent went to land use. South Windsor Treatment Plant undergoes continual upgrades to infrastructure to increase efficiency of the treatment process. This included the installation of variable speed drives and soft start equipment on pump motors and the implementation of new sludge handling procedures. Sludge reduction products have been introduced at South Windsor to reduce the volume of sludge produced. Sludge is still being utilised on site at both treatment plants.

- Replace aging pumps in pump stations with the new, more efficient class motors.

- All major pump stations owned by Council have been networked with a new monitoring system.

- A new pump station and rising main has been constructed and commissioned in Pitt Town to serve the existing community and new development.

Waste Management has also undertaken an analysis of the sewage pump stations in relation to capacity, redundancy, emergency storage capacity, and modelling of the sewerage system described within the Sewer Overflow Investigation Report. This analysis has highlighted some deficiencies within the system. Some deficiencies such as additional storage at pump station G has been rectified with others being planned, designed and budgets allocated for future construction.

Future directions

The strategy for City Sewerage is as it has always been which is to plan & implement maintenance, replacement & expansion strategies to ensure an adequate level of service in terms of reliability and environmental impact.

Effluent re-use, is an opportunity that Hawkesbury City Council is continuing to investigate and improve upon. Presently, 40 - 50% of the effluent from the McGrath's Hill plant is used. The remainder of the treated effluent is discharged into South Creek. Council received a grant from the State Government to provide recycled water for irrigation and toilet flushing from South Windsor Treatment Plant to Council reserves and schools throughout South Windsor. This project is currently in the planning stage.

Council is progressing with upgrades and maintenance of its reticulation system. Council is proactive using closed circuit TV to assess the condition of sewer mains in order to extend the life of its existing assets and protect public health and the environment. Council's reline program is underway, starting with the original sewer mains laid in the 1930's.

McGrath's Hill Sewage Treatment Plant.

Onsite Sewage Management Facilities

Introduction

Under the Local Government Act 1993 property owners are required to obtain, from Council, an Approval to Operate for their on-site sewage management facility. This is to help ensure that they operate their system in a manner that will protect the environment and public health.

These regulatory reforms were introduced following the results from numerous surveys undertaken by various government bodies, including local councils, which revealed that on-site sewage management systems are non-compliant to a rate of around 70%. Unfortunately a lot of these failures are not meeting basic operating criteria, which includes management of effluent application areas, ponding and contamination of water and groundwater with possible reasons for failure being poor design, operator mismanagement, inadequate maintenance and inadequate supervision and co-ordination across New South Wales. This was highlighted by an outbreak of Hepatitis A in 1997, where over 400 people contracted the disease. This outbreak was linked to the consumption of Wallis Lake Oysters contaminated by effluent from on-site sewage systems.

The Septic Safe Program was introduced in 1998 by the NSW Government to provide support and supervision to landowners and councils as they implement and undertake their respective sewage management responsibilities.

The Septic Safe program commence in the Hawkesbury LGA in 1999. Property owners had been sent registration forms to fill in and return to Council with type of system, land area of property and distance to water course. They were given a risk category based on the information gathered. There were 8458 systems registered at this time. Of this number there were 5222 absorption trench systems, 1778 pumpout systems, 1379 aerated wastewater treatment systems, 35 cesspits and 44 compost systems.

It is estimated there are more than 11,000 on-site sewage systems within the Hawkesbury. Pump-out service is provided to 1959 premises, which includes residential and commercial.

Other onsite sewerage management facilities include

- Aerated Wastewater Treatment Systems (AWTS)
- Waterless Composting Toilets
- Recirculating Aerobic Sand Filter Devices
- Wet Composting Toilets
- Combustion Toilets
- Septic Tanks with Absorption Trench

Generally, the septic tank pre-treats the wastewater before it goes to the land application system. Effluent from the unit receives further treatment by natural processes in the land application system. The type of system depends on the soil conditions, the slope, vegetation and underlying subsoil. Irrigation systems operate both by soil absorption and by evapotranspiration from plants including grass, shrubs and trees.

A failed septic system may contribute to a serious health and environmental hazard and may can lead to:

(a) Spread of infectious disease

(b) Breeding of mosquitoes and attraction of flies and rodents

(c) Pollution and infection of waterways

(d) Contamination of bores, wells and groundwater

(e) Alteration of the local ecology

If requests for rectification works to ensure compliance are ignored Council may issue a Clean Up Notice under the Protection of the Environment Operations Act 1997. A penalty infringement notice may be issued for non-compliance to a Clean Up Notice.

Measures of Performance

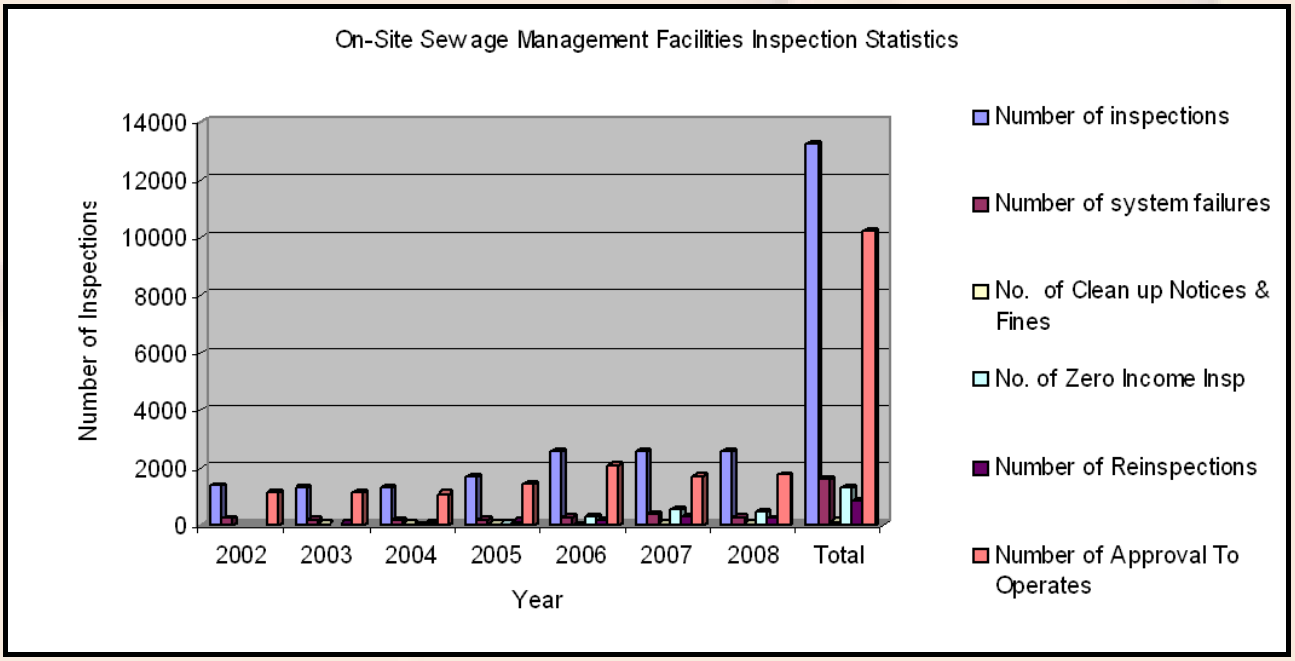
Measure

1. To improve the management of the on-site sewage management systems
2. Encourage and support property owners to improve the management and performance of their on-site systems.

How is the Hawkesbury performing?

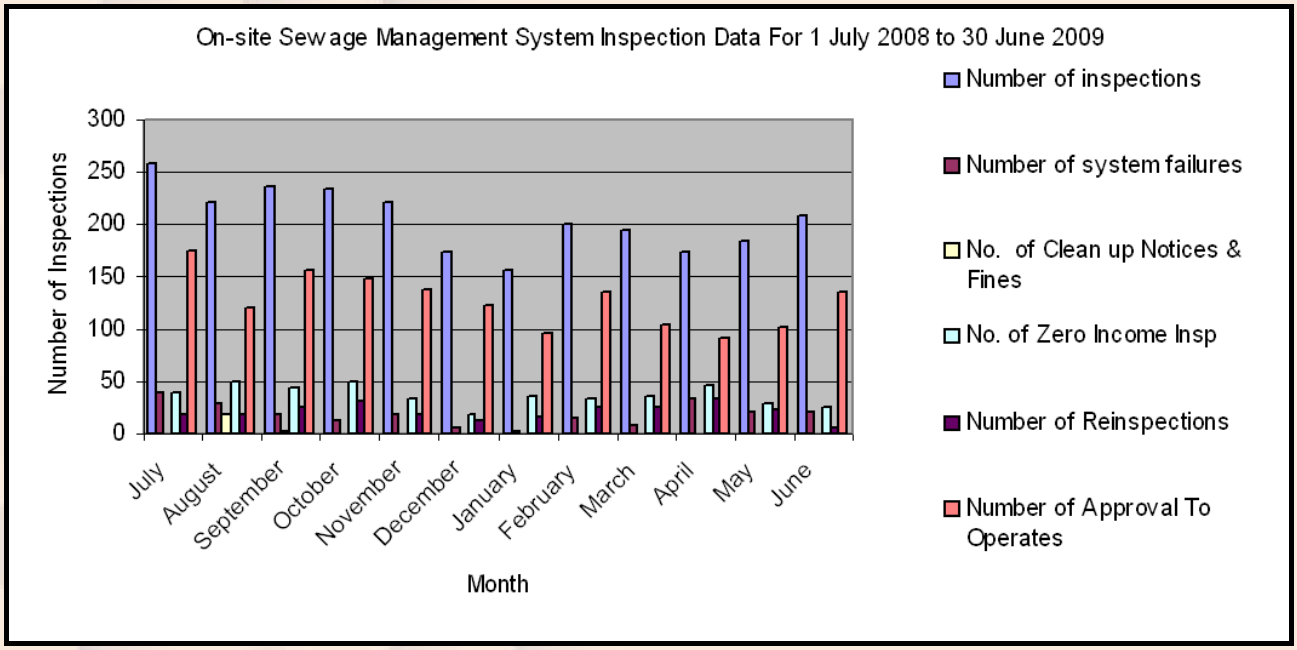
The number of failed systems are decreasing

Current status and trends



Since the Septic Safe Program started in November 2002 through to June 2009 there has been 12555 inspections carried out in the Hawkesbury. Of those inspection there has been 10876 approvals issued (86.6%) and there have been 1679 failed systems (13.4%).

In relation to the percentage of failing systems one must be aware that some properties have been inspected twice or maybe even three times and have had the chance to repair and make compliant their systems. So the next inspection they are normally given an approval to operate unless there is a problem.



From July 2008 to June 2009 there has been 2454 inspections carried out, the number of approvals issued were 1525 (87%) and failed systems were 227 (13%), there were also 256 reinspections, 209 building drainage inspections and 237 customer advice and complaint inspections.

If requests for compliance are ignored Council may issue a Clean Up Notice under the Protection of the Environment Operations Act 1997. A penalty infringement notice may be issued for non-compliance of a Clean Up Notice.

Response to the issue and Future Directions

The Septic Safe program in the Hawkesbury Local Government Area continues to improve the management of the on-site sewage management systems and to encourage and support property owners to improve the management and performance of their on-site systems.

Not all aerated wastewater treatment systems work as efficiently as they should. The depicted system was not being maintained at the time of inspection, it was overflowing, causing not only a health risk to the occupiers of the residence but also a problem to the environment.

Centralised (package) Sewage Treatment Plants

The 64 package plants in the Hawkesbury include privately owned commercial plants, and plants owned by community neighbourhood associations on multi-lot subdivisions.

Small wastewater treatment plants should be designed, constructed and managed to achieve the following environmental performance objectives:

- Measures employed to deal with emergencies with damage to any surface waters or to the soil/land
- All wastewater treated and retained on land wherever practicable and environmentally beneficial
- Measures employed to conserve water resources or provide for the re-use or recycling of treated wastewater

The objective of wastewater disinfection is to prevent the spread of waterborne pathogens found in wastewater, by protecting the source of water supplies, bathing areas, shellfish bed growing areas and other food sources. The reduction in number of faecal coliform organisms is used as an indicator of the efficiency of a disinfection process. High levels of organic chlorine compounds from chlorinated effluent discharging to streams are toxic to fish life and currently not tolerated unless the premises holds a discharge license from the Department of Environment and Climate Change.

It is essential to achieve a consistently high level of environmental performance, which incorporates good management practices. Best environmental management practices for wastewater plants include a:

- Commitment from management which is communicated to all potential residents
- Adherence to best practice environmental management guidelines
- Alert and informed supervision
- Regular operator/maintenance training
- Exercising control over the treatment process
- Detailed written procedures for each activity established and used by operation staff
- Contingency plans
- High level of housekeeping on the site
- Continuous improvement

Council is constantly reviewing these practices and implementing further controls through 'Prevention Notices' served in accordance with the Protection of the Environment Operations Act.

These Notices ensure high technical standards are met whilst preventing any pollution to land or receiving waters.

Non-Aboriginal Heritage

Introduction

Council manages it's heritage sites by implementing the requirements of the NSW Heritage Office, Burra Charter, recommendations of Council's Heritage Advisor, and by imposing relevant conditions on development consents to maintain the integrity and significance of heritage listed items.

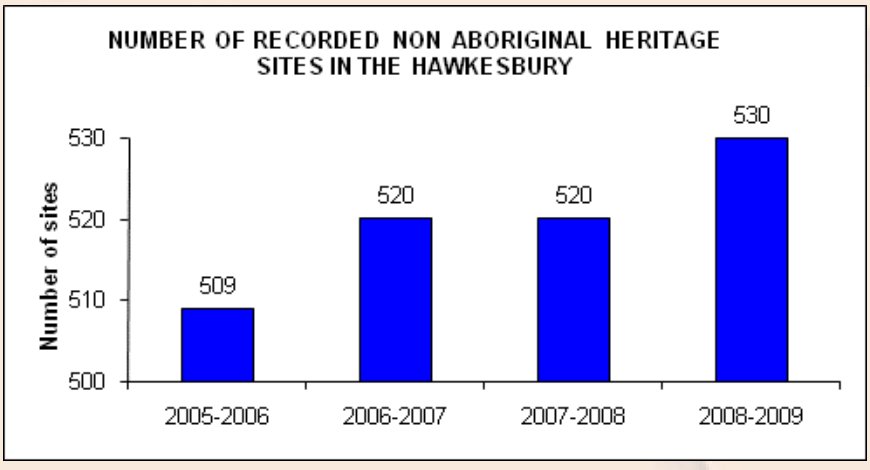
Heritage items in the City are identified in Schedule 1 of Hawkesbury Local Environmental Plan 1989 (HLEP) protected by special clauses within the HLEP 1989 relating to heritage items and conservation areas. Some properties are also subject to an Interim Conservation Order or included in the State Heritage Register and therefore are protected by the Heritage Act 1977.

Heritage based tourism is very important to the Hawkesbury area. In particular the town centres of Richmond and Windsor are a focal point for entertainment, dining and tours of heritage items. Throughout the City there are number heritage items used as restaurants, guest houses and bed and breakfasts. Heritage based tourism serves to educate visitors about the Hawkesbury Region and promote the conservation of the City's heritage items.

Measures of performance

Measure	**How is the Hawkesbury performing?**
1. Total number of recorded non-aboriginal heritage sites in the Hawkesbury.	The number of identified and managed non-Aboriginal heritage sites in the Hawkesbury has increased in 2008-2009.

Current status and trends



Outcome 1

The number of identified and managed non-Aboriginal heritages sites in the Hawkesbury has remained stable in 2008-2009. Note: During the 2006-2007 and 2007- 2008 reporting periods the number of items listed was based on an approximate figure. The number listed in the 2008-2009 reporting period, being 530, represents an actual figure confirmed by inspections.

In addition to the number of identified and managed non-Aboriginal heritage sites there are 4 conservation areas.

Summary of Pressures

Pressures that are relevant having regard to the long term preservation of heritage items include:

- Pressure for redevelopment of land containing a heritage item;
- Increasing age of properties and associated increase in maintenance burden on owners;
- Inadequate level of maintenance resulting in degradation or potential loss of heritage item; and
- Unsympathetic and unauthorised works causing an adverse impact upon existing heritage fabric.

It is noted that no money for the Local Heritage Assistance Fund was allocated in reporting period.

Response to the Issue

Hawkesbury Regional Museum

The Hawkesbury Regional Museum has won a New South Wales Local Government Cultural Award for Cultural Infrastructure for areas with a population over 60,000. The Awards are conducted by the Local Government and Shires Association and aim to celebrate council cultural success. Award winners in various categories were announced at a function at Parliament House Friday, 1 May 2009.

The opening of Hawkesbury Regional Museum in May 2008 marked the completion of a project to upgrade cultural facilities in the Hawkesbury and create the Hawkesbury Cultural Precinct. As well as the Museum, the precinct comprises the Deerubbin Centre, housing the Hawkesbury Central Library Service and Hawkesbury Regional Gallery.

The development of the Hawkesbury Regional Museum involved joint funding and the co-operation of Council, The New South Wales Government through the then Ministry of the Arts, the Commonwealth Department of Transport and Regional Services and the NSW Heritage Office. The project was initiated in 2000 when Council made a commitment to a major upgrade of cultural facilities in the area.

At the Museum opening in May 2008, Her Excellency Professor Marie Bashir, Governor of NSW, declared the museum design a credit to the people of the Hawkesbury, demonstrating their willingness to value the past while also looking to the future.

Heritage Advisor and Heritage Advisory Committee

Council employs a heritage advisor, on a consultancy basis, to assist in fulfilling Council's strategic heritage management programs. The advisor is available on a fortnightly basis providing advice to property owners, intending purchasers, government agencies and Council on development related matters, conservation strategies and policy formulation.

Support is also given to the Heritage Advisory Committee that meets regularly to examine matters relating to heritage. This committee also provides advice to Council and owners of heritage items.

Council funding invested into the protection, restoration and/or management of non-Aboriginal heritage items was $28 380.

Aboriginal Heritage

Introduction

When the Hawkesbury electorate census was compiled in early 1892, Aborigines were not included but 41 Chinese were. The census showed that there were 10,339 males and 4,918 females, "exclusive of Aboriginals", in the electorate. A total of 67 Aborigines was shown to be residing in the Hawkesbury (Windsor) District in the Aborigines Protection Board's report for 1892. The previous year's figures claimed 91 Aborigines to be located in the district.

There had been a sickness that affected the Aboriginal people and many perished within this time. When any of the indigenous population were ill they were admitted to the Benevolent Asylum at Windsor, on the recommendation of the local police. The police acted as agents of the Protection Board.

The Aborigines mainly congregated at North Richmond, downstream of Windsor at Wilberforce and Sackville Reach.

(Source: Jack Brook (1994,1999) "Shut out from the World- The Hawkesbury Aborigines Reserve and Mission 1889- 1946. Deerubbin Press)

Sorry Day has been commemorated for over a decade. It serves to acknowledge the plight of the Stolen generation of Aboriginal children as well as the mistreatment of Aborigines in all forms.

We must always remember the generations of Indigenous people whose struggles and efforts have culminated in this unique opportunity to display the richness and diversity of Aboriginal cultures to the wider Australian community.

On Wednesday 13th February, 2008 the Hon, Prime Minister Mr Rudd read the following:

> *"That today we honour the Indigenous peoples of this land, the oldest continuing cultures in human history.*
>
> *We reflect on their past mistreatment.*
>
> *We reflect in particular on the mistreatment of those who were Stolen Generations—this blemished chapter in our nation's history.*
>
> *The time has now come for the nation to turn a new page in Australia's history by righting the wrongs of the past and so moving forward with confidence to the future.*
>
> *We apologise for the laws and policies of successive Parliaments and governments that have inflicted profound grief, suffering and loss on these our fellow Australians.*
>
> *We apologise especially for the removal of Aboriginal and Torres Strait Islander children from their families, their communities and their country.*
>
> *For the pain, suffering and hurt of these Stolen Generations, their descendants and for their families left behind, we say sorry.*
>
> *To the mothers and the fathers, the brothers and the sisters, for the breaking up of families and communities, we say sorry.*
>
> *And for the indignity and degradation thus inflicted on a proud people and a proud culture, we say sorry.*
>
> *We the Parliament of Australia respectfully request that this apology be received in the spirit in which it is offered as part of the healing of the nation.*

For the future we take heart; resolving that this new page in the history of our great continent can now be written.

We today take this first step by acknowledging the past and laying claim to a future that embraces all Australians.

A future where this Parliament resolves that the injustices of the past must never, never happen again.

A future where we harness the determination of all Australians, Indigenous and non-Indigenous, to close the gap that lies between us in life expectancy, educational achievement and economic opportunity.

A future where we embrace the possibility of new solutions to enduring problems where old approaches have failed.

A future based on mutual respect, mutual resolve and mutual responsibility.

A future where all Australians, whatever their origins, are truly equal partners, with equal opportunities and with an equal stake in shaping the next chapter in the history of this great country, Australia."

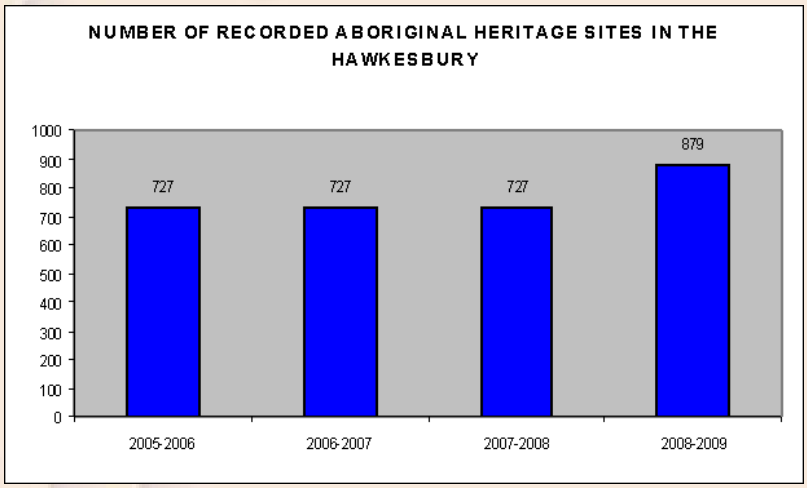
For several years, the Hawkesbury community has taken steps towards our own healing through the recognition of the Darug people as the traditional owners of these lands.

It is important to Council and it should be important to all Hawkesbury residents, that the aboriginal community is seen as a part of the Hawkesbury society.

Measures of Performance

Measure	**How is the Hawkesbury performing?**
1. Total number of recorded Aboriginal heritage sites in the Hawkesbury.	The number of Aboriginal Sites have increased.

Current status and trends



Outcome 1

This graph represents the number of recorded Aboriginal heritage sites in the Hawkesbury as managed by the NSW Government but are report as an indicator of the cultural health of the Hawkesbury Local Government Area.

Response to the issue

Hawkesbury City Council has sent representatives to NAIDOC Week and Sorry Day events over the years. NAIDOC originally stood for 'National Aborigines and Islanders Day Observance Committee'. This committee was once responsible for organising national activities during NAIDOC Week and its acronym has become the name of the week itself.

The Hawkesbury community celebrates NAIDOC Week every year. NAIDOC celebrates the survival of Indigenous culture and the Indigenous contribution to modern Australia. All Australians are encouraged to participate in NAIDOC Week activities.

The Hawkesbury NAIDOC celebration is a great way for our community to celebrate Indigenous culture and build bridges between Indigenous and non-Indigenous Australians.

In response to the Federal Government's Apology to the Indigenous People of Australia Hawkesbury City Council at its Ordinary meeting held on 26 February 2008 resolved that Council:

1. Write to the Federal Government congratulating them on the Sorry Day held on Wednesday, 13 February 2008.

2. Endorses the Commonwealth Parliament's apology to Indigenous Australians who suffered as a result of past policies of forced separation.

Future directions

Aboriginal heritage sites occur throughout many zonings in the Hawkesbury local government area and are threatened by most land uses. The lack of information available to Council is also of concern.

There is a growing awareness in the Local Government Area of the need to ensure that the diverse culture and traditions of Aboriginal communities are supported.

Hawkesbury City Council is interested in developing a protocol, in conjunction with local Traditional Owners and Deerubbin Local Aboriginal Land Council for the notification, referral and consideration of matters during assessment of development applications consistent with relevant legislation including the National Parks Act 1979 and Environmental Planning and Assessment Act 1979.

Solid Waste

Introduction

Hawkesbury City Council provides waste and recycling services to the residents of the Hawkesbury LGA. Services include domestic waste and recycling collections, area based kerbside bulk waste collections and the operation of the Hawkesbury City Waste Management Facility, which incorporates land filling operations.

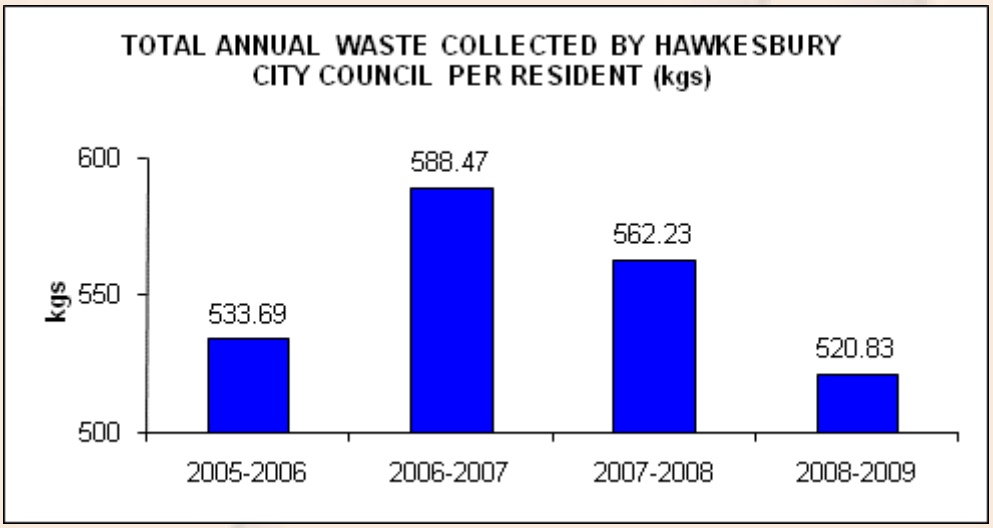
The domestic kerbside waste bin collection service is undertaken by Council's day labour whilst the commingled dry recycling bin service is undertaken by J.J. Richards and Sons, under contract. The on-call bulk kerbside waste collection service is provided, under contract by Cleanaway, to selected areas that are more densely populated and provides each household within these areas two collections each financial year.

The Hawkesbury City Waste Management Facility is located on two parcels of land with a combined area of approximately 31.5 Ha. The facility is located on the corner of Blacktown Road and The Driftway, South Windsor, and is operated under an EPA licence. The site consists of a gatehouse with entry and exit weighbridges, a putrescible waste landfill and drop-off areas for items to be deposited for collection by recycling contractors or to be reprocessed onsite.

Measures of Performance

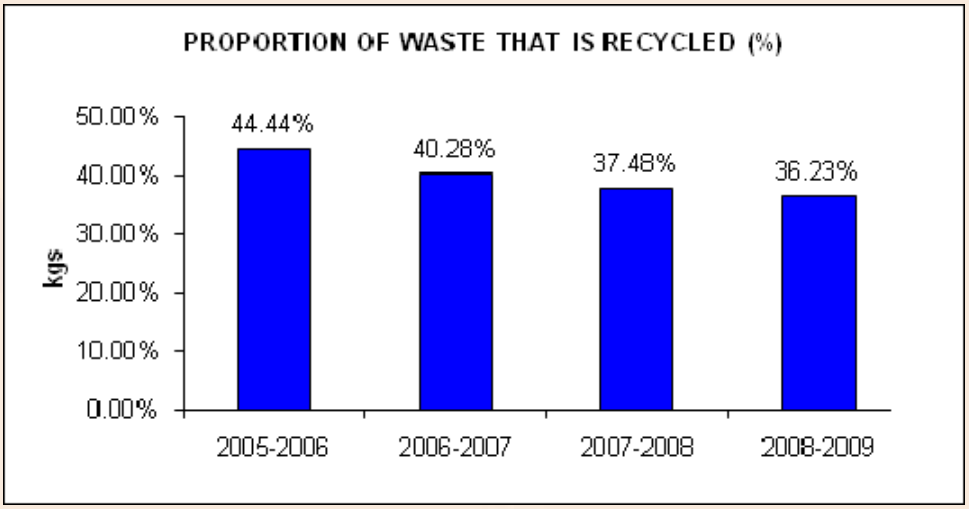
Measure	How is the Hawkesbury performing?
1. Total annual waste collected per resident. 2. Proportion of collected waste that is recycled.	Per resident waste collection has decreased between 2006-2007 and 2008-2009. The proportion of waste that is recycled has remained steady.

Current status and trends



Outcome 1

The total annual waste collected per resident peaked in 2006/07 and has decreased significantly since that time.



Outcome 2

The percentage of total annual waste that is reprocessed or recycled has steadily decreased over the past 4 years by 5.21%.

The percentage of the total waste that is reprocessed or recycled has decreased by 5.2% over the past 4 years. This figure does not look to be a positive result however the percentage of recyclables deposited at the waste facility has decreased substantially which may be due to an increase in the price of scrap metal and the increasing number of facilities in the area that reprocess or recycle materials that may have previously been deposited at the Hawkesbury City Waste Management Facility.

Response to the issue

Council has introduced a number of changes at the Waste Facility in recent years in an effort to reduce the quantity of waste to landfill.

This includes the diversion of vegetation to produce mulch, the separation of metal, timber and concrete, as well as the diversion of other materials such as paper/cardboard, household dry recyclables, lead acid batteries, small LPG gas bottles, sump oil, tyres and mattresses.

Council continues to work to improve the management of solid waste through a number of initiatives including:

- The formation of the Waste Management Advisory Committee.

  The objectives of the Waste Management Advisory Committee Constitution are as follows:

  - To advise Council about information, research and analysis required to provide future options for waste management for our city
  - To recommend to Council preferred options for our future waste management strategies, systems and technologies
  - To liaise with local communities on waste management issues, to ensure that the community's views are included in the decision making processes of Council

  - To liaise with neighbouring councils and government agencies, to ensure the best outcomes of any considered strategies, systems and technologies
  - To advise Council about public awareness strategies and to act on Council's behalf to implement these strategies as required

- Provision of a fortnightly kerbside recycling service to residents
- Undertaking waste audits and using the data to provide meaningful waste education to Hawkesbury residents.
- Involvement in the “CleanOut” chemical collection program
- Involvement in the drumMUSTER (agricultural drum recycling) program
- Involvement in the “Cartridges for Planet Ark” Program
- Involvement in the “Aussie Recycling Program” mobile phone recycling program
- Enforcement programs to police illegal dumping and poor waste management practices in the community

Future directions

The State Government has set a NSW target of 66% of domestic waste to be recycled by the year 2014, as detailed in the Waste Avoidance and Resource Recovery Strategy 2007.

Council is currently considering its options through the Waste Management Advisory Committee to increase the amount of domestic waste to be recycled with a view to achieving a recycling rate of 66% by the year 2014.

Council will continue to collect data to identify areas in which further reductions in waste to landfill may be achieved and shall strive to divert as much waste from landfill as possible.

Weighbridges at the Hawkesbury Waste Management Facility

Water Management - Sydney Water

Introduction

Potable Water services are supplied by Sydney Water. For the last two centuries Sydney responded to the rising demand for water with the traditional "project and provide" approach.

It is now clear that Sydney Water cannot continue to harvest water from outside its immediate region to meet demand without serious environmental consequences.

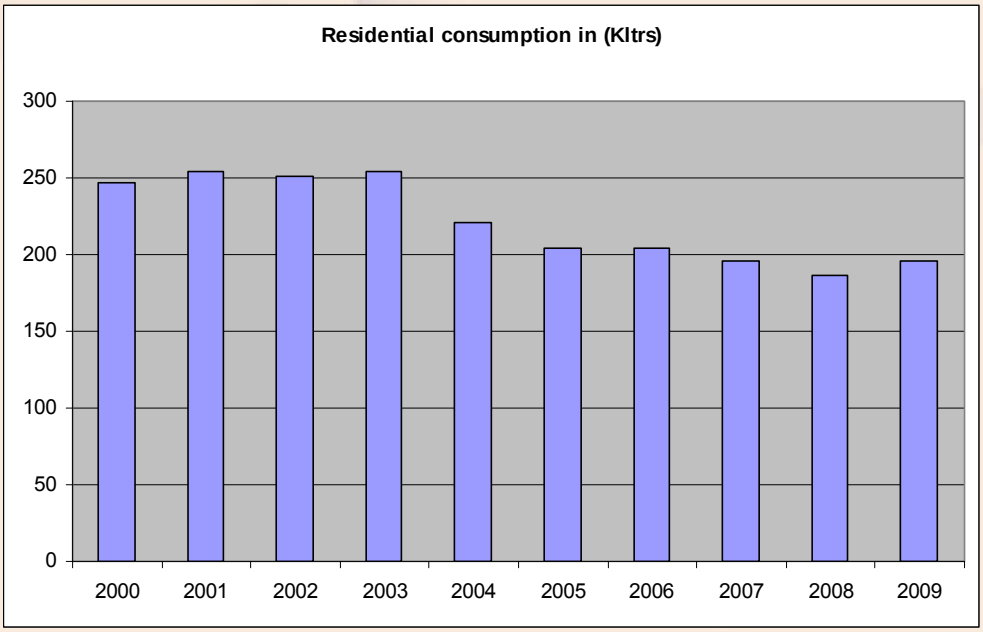
The Metropolitan Water Plan, was developed to meet the increased demand from a predicted increase in population over the next 25 years.

Measures of Performance

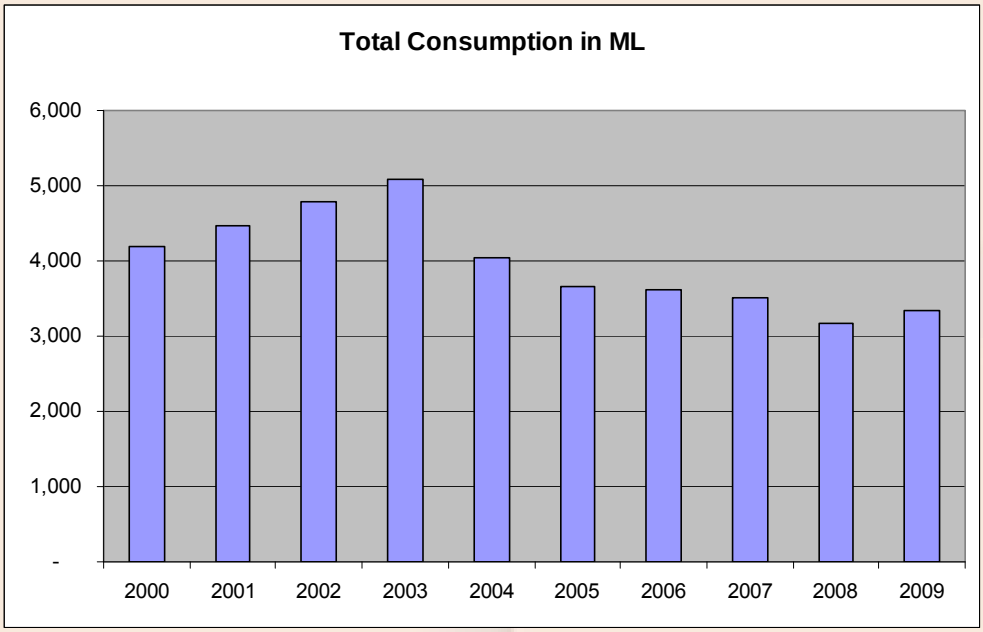
Measure	**How is the Hawkesbury performing?**
1. Total water consumption 2. Water consumption per resident.	Water consumption across the Hawkesbury decreased significantly between 2006-2007 and 2007-2008.

Current status and trends

Sydney water currently have 5240 connections in the Hawkesbury Local Government area.



2009 Water Consumption is currently not available from Sydney Water



Response to the issue

Sydney Water started construction of the Glossodia, Freeman's Reach and Wilberforce Sewerage Scheme in April 2009.

The scheme will provide improved sewerage services to the unsewered urban areas of the three towns through the installation of a pressure sewerage system and associated infrastructure. Wastewater from the three towns will be transferred to Richmond Sewage Treatment Plant.

About 1,600 property owners in the three towns will have the opportunity to connect to the new system. Connections to the sewerage system are expected to be available to property owners progressively from 2011.

By connecting to the new system residents will be helping to reduce the number of septic systems in the area. This will improve local waterways and reduce risks to public health.

Some current activities include:

- Constructing the sewage pumping station at Hibberts Lane, Freeman's Reach
- Increasing the capacity of Richmond Sewage Treatment Plant
- Installing new sewer pipes in Freeman's Reach
- Installing connection points on eligible Freeman's Reach properties
- Locating existing underground services and site inspections in Glossodia.

Future directions

In March 2009, Sydney Water determined to proceed with construction of the Agnes Banks and Londonderry Sewerage Scheme, which is part of the NSW Government's Priority Sewerage Program. Sydney Water is delivering the scheme in alliance with MWH Australia, John Holland Group, United Group Infrastructure and Manidis Roberts.
The scheme will provide improved sewerage services to unsewered urban areas in the two villages through the installation of a pressure sewerage system and associated infrastructure. Wastewater from both Agnes Banks and Londonderry will be transferred to Richmond Sewage Treatment Plant.

About 290 property owners in Agnes Banks and Londonderry will have the opportunity to connect to the new system.

By connecting to the scheme residents will help to reduce the number of septic systems in the area. This will improve local waterways and reduce risks to public health.

Noise

Introduction

Noise pollution complaints or enquiries made at Council are predominantly from sound equipment, motor vehicles, and motorcycles or as a result of land use conflicts such as residential versus commercial land uses. Council is considered as the Appropriate Regulatory Authority (ARA) for most noise pollution enquiries that occur within the Local Government Area (LGA) with the exception of premises that are licensed with the Department of Environment and Climate Change (DECC) or noise related issues with aircraft traffic noise which is the responsibility of the Richmond RAAF Base.

In order to resolve noise pollution complaints, Council have several options available to manage and mitigate noise, where possible.

Encouragement is given to all parties involved to try and resolve the matter without Council intervention through regular communication, or failing that, through mediation services provided by the Community Justice Centre.

Council's primary means of dealing with noise issues in the LGA is via enforcement using relevant sections of the Protection of the Environment (Operations) Act 1997, which gives Council increased powers to control offensive noise. Council instigates further action only after the matter has been attempted to be resolved between the noise source and the complainant.

Council also endeavours to proactively manage noise issues by incorporating noise control conditions into approvals for new developments, with conditions of consent placed on industrial and commercial activities to control permissible hours of operation. Council sees the development application stage as the most effective time to bring potential noise pollution to the forefront, thereby allowing noise pollution to be addressed in the early stages and potential problems avoided.

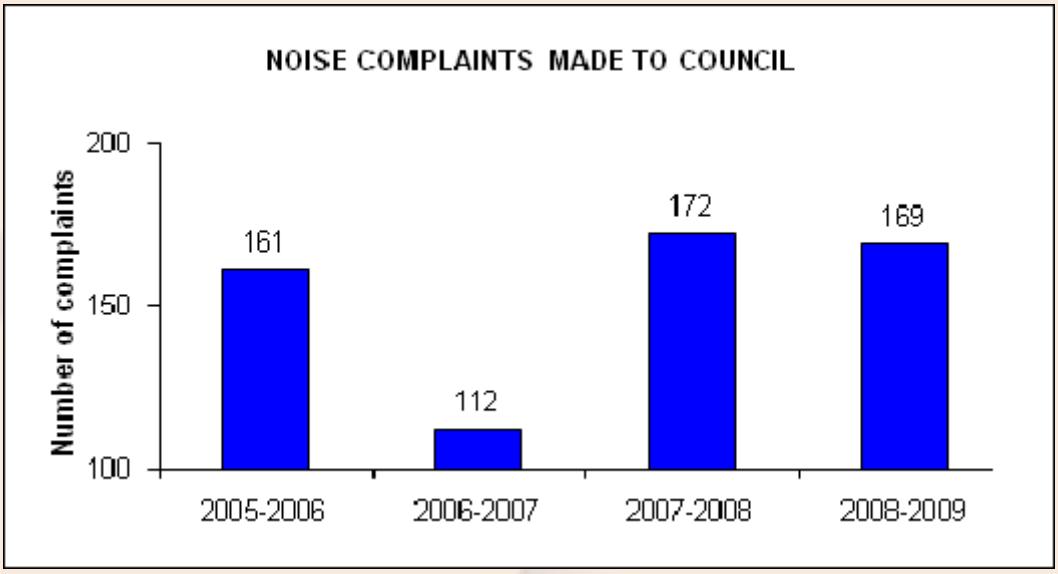
Measures of Performance

Measure	**How is the Hawkesbury performing?**
1. Total number of noise complaints made to Council.	 The number of noise complaints made to Council has remained stable.

Current status and trends

Since the reporting period 2004/2005 to present 2008/2009 one abnormality had occurred in the period 2006/2007, which could only be a result of incorrect data entry not capturing all complaints in relation to noise. Notwithstanding the one abnormality noise related complaints have remained relatively steady.

When dealing with noise complaints it is constantly reported to Council that the general public would rather contact Council to have the matter resolved than try and mitigate between themselves. Numbers represented in the graphs from previous years may have been able to be reduced, however community awareness of resources such as the Community Justice Centre have not been utilised by Council for many issues. Further use of such services may see future numbers reduce.



Outcome 1

Response to the issue

Data management practices are constantly being improved to ensure that all staff within Council that deal with noise complaints record information correctly on the database system.

Future directions

To provide an alternative option for the residents of the Hawkesbury City Council resources such as the Community Justice Centre and the Local Court system will be utilised and advised for neighbourhood noise disputes.

The development of standard written responses and additional training of administration staff promoting these external resources available to the general public may ease the numbers of noise complaints received by Council.

Council will continue to utilise its ability to control potential noise from new developments through the implementation adequate conditions of consent, which reflect current legislative requirements and Council's Development Control Plan relevant to the Hawkesbury City Council Local Government Area.
Council will also continue to use its database system, which allocates timeframes for responses to noise complaints and records all actions taken during the investigation process.

Council continually seeks to improve methods to provide a better service to the general public through training of Council staff of new and upcoming legislative requirements and development of improved internal procedures when dealing with noise issues.

Energy

Introduction

The NSW energy savings initiatives were introduced by the NSW Government in May 2005. They were administered by the Department of Energy, Utilities and Sustainability (DEUS) who are now a part of the Department of Environment and Climate Change (DECC). The legislation requires certain businesses, government agencies and local councils to prepare Energy Savings Action Plans by 2008. Hawkesbury City Council is required to develop an Energy Savings Action Plan (ESAP) in accordance with the guidelines set out by the NSW Government.

The guidelines require Council to include the following in its ESAP:

- Details of baseline energy consumption
- Management review and associated management actions related to energy
- Details of audits and reviews carried out to identify energy savings opportunities; and
- Actions for implementation

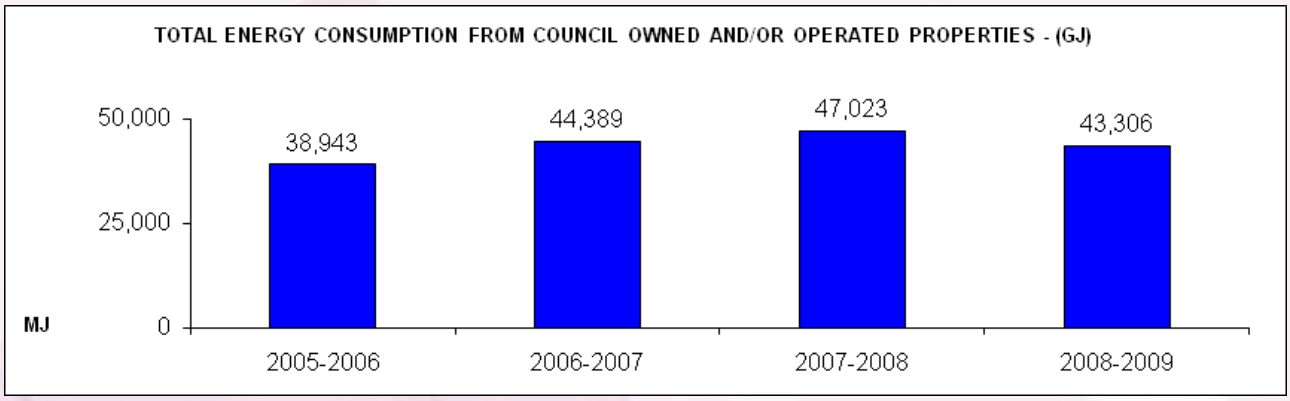
The ESAP is focused on the top ten energy consuming sites operated by Council. This document has been developed to meet the requirements for development of a ESAP, and includes the following sections:

- Baseline water performance data for all Council properties
- Management review outcomes
- Management actions
- Energy savings measures; and
- Associated background information

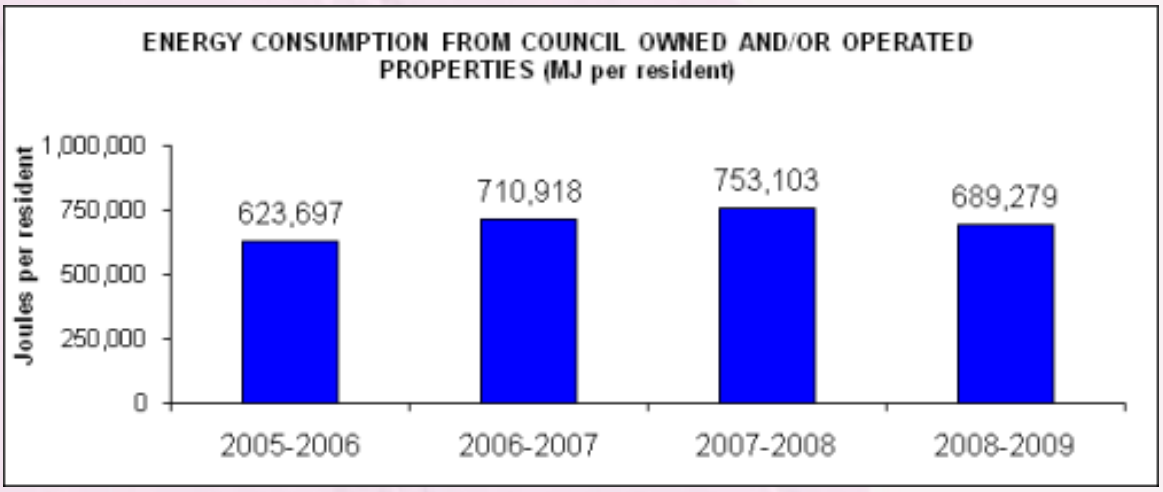
Measures of Performance

Measure	**How is the Hawkesbury performing?**
1. Total energy consumption from Council operations. 2. Council energy consumption per resident.	 Council's energy consumption has decreased since 2007-2008.

Current status and trends



Outcome 1



Outcome 2

There is an increasing demand for Council services as a result of increasing City population, leading to a rise in energy consumption from Council infrastructure. However, Council's energy consumption has slowed in 2007- 2008 compared to previous years.

During 2005-2006, Council replaced the Green Energy Strategy, completed under the Cities for Climate Protection, with the Energy Savings Action Plan. This current blue print expires on 10 November 2012.

Response to the issue

In terms of energy abatement actions, key projects completed recently include the installation of building management systems in the primary energy consuming buildings to improve the control over heating, cooling and lighting, introduction of power factor correction to key buildings, and the ongoing implementation of a staff energy awareness campaign. Please refer to “Possible Energy Savings Actions by Site” at Appendix A.

Council has also incorporated energy efficient design into its new buildings, the most recent being the Deerubbin Centre that was opened during 2005-2006 and the Hawkesbury Regional Museum opened in 2008.

Council's Footprint

HAWKESBURY CITY COUNCIL

The Hawkesbury City Council's, Energy Savings Action Plan was approved by the Minister for Climate Change and the Environment on 10 November 2008. This Plan now becomes the blueprint for change within the Council over the next four years. In particular, further monitoring of many sites will need to be carried out to ensure a better understanding of the energy characteristics at those locations. An annual progress report on outcomes of the plan must be submitted to DECC.

Council subscribes to an independent environmental score keeper Planet Footprint who captures and monitors data on waste, energy, water, street lighting, fleet management and greenhouse gas emissions.

"Scrappy" Council's waste mascot completing energy audits during the Energy Education Campaign

Future directions

Council has been actively working to reduce energy consumption from its own operations for many years, and has implemented a number of energy efficient features into its buildings and assets. Please refer to "Possible Energy Savings Actions by Site" at Appendix A.

The Hawkesbury City Council's Management Executive Team adopted the following actions, in September 2008 to enforce Council's ongoing commitment to reducing energy across Council's assets.

- Develop and implement an Operational Management Standard that effectively incorporates energy, and infrastructure management issues to prioritise the strategic direction for the allocation of required resources.
- Develop a strategic plan for managing energy that looks at least five years forward. Focus on targets to be achieved and systems to be established.
- Ensure managers are fully aware of the importance of a strategic approach to energy management within Council.
- Develop a protocol to initiate prompt corrective action whenever personnel become aware of energy waste.
- Develop a central register of all environmental legal and other requirements including relevant legislation, codes of practice, community agreements, licenses and permits related to energy management.

- Develop and implement a process for a consistent and effective method of communicating significant and relevant energy and water management issues, and applicable regulatory requirements to key personnel.
- Develop broad and long term energy improvement objectives to provide strategic direction to the organisation's energy and water programs.
- Implement a simple and streamlined process to ensure management and staff consider the current energy issues and associated indicators, objectives and targets, when developing the management and operating plans and budgets, to ensure these plans include strategic programs to address these issues and meet these objectives.
- Select appropriate persons from each division to represent that Division or Branch on the Internal Energy and Water Steering Team.
- Identify a staff member to act as the organisation's energy performance coordinator, to oversee the implementation and maintenance of energy management frameworks and processes.
- Encourage staff to provide feedback on energy and water issues during team meetings, and to pass on important environmental information to staff as required.
- Develop procedures for dealing with internal requests for energy and water information, and train all staff (especially customer service staff) on these procedures. Document the process for internal and external energy and water related communication into a formal procedure and communicate to key personnel.
- Develop management system procedures to store reports and energy use information in a database for ready access.
- Develop a protocol to initiate prompt corrective action whenever personnel become aware of energy waste.
- Develop and implement an organisation-wide purchasing and procurement procedure that incorporates consideration of energy issues at all stages.
- Regularly monitor the energy use of major facilities, cost- centres or energy intensive end users.
- Adjust existing identification processes and forms to include environmental incident and non-conformance identification, including the reporting of energy 'issues'; and
- Develop, implement and document a process for the regular auditing of operations against controls and procedures developed to improve energy performance.

Possible Energy Savings Actions by Site

Please refer to Appendix A - Possible Energy Savings Actions by site

Greenhouse Gas Emissions

Introduction

The climate system appears to be changing faster than earlier thought likely. Key manifestations of this include the rate of accumulation of carbon dioxide in the atmosphere, trends in global ocean temperature and sea level, and loss of Arctic sea ice.

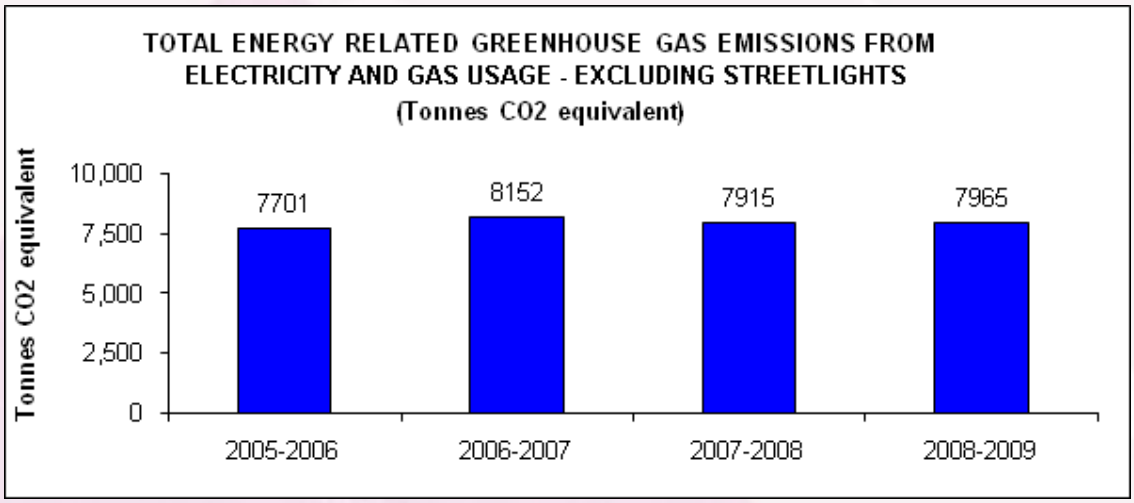
The risk of continuing rapid climate change is focusing attention on the need to adapt, and the possible limits to adaptation. Critical issues in the Australian context include the implications of possible sea-level rise, the threat of recurring severe droughts and the drying trends in major parts of the country; the likely increase in extreme climatic events like heatwaves, floods and bushfires; and the impacts of an increasingly acidic ocean and higher ocean temperatures on marine resources and iconic ecosystems such as the Great Barrier Reef.

Climatic features such as extreme events, abrupt changes, and the nonlinear behaviour of climate system processes will increasingly drive impacts on people and ecosystems. Despite these complexities, effective societal adaptation strategies can be developed by enhancing resilience or, where appropriate, building the capacity to cope with new climate conditions. The need for effective reduction in greenhouse gas emissions is also urgent, to avoid the risk of crossing dangerous thresholds in the climate system.

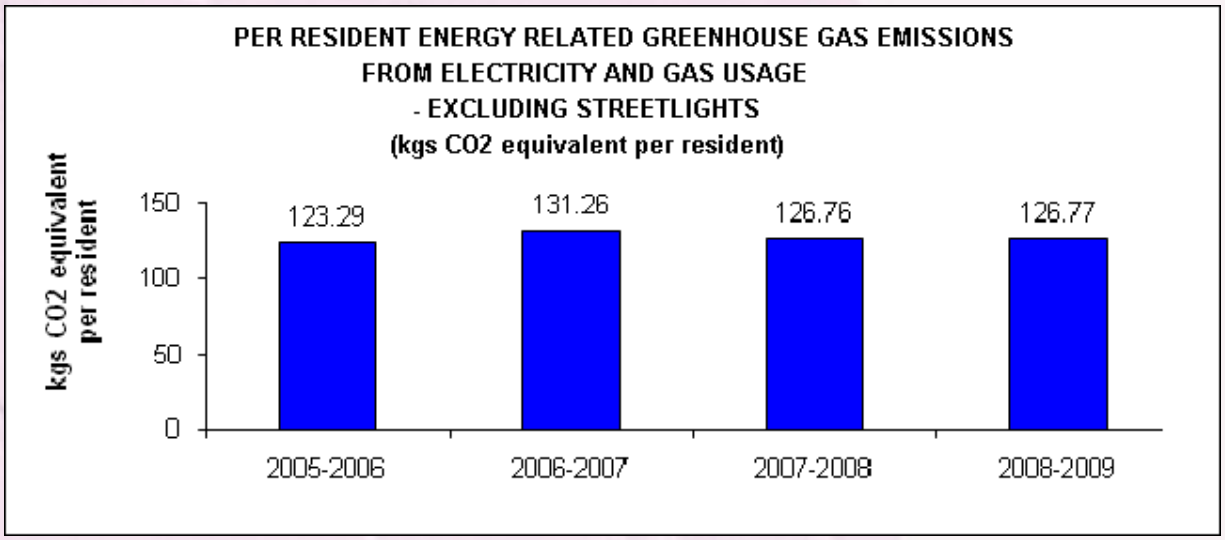
Measures of Performance

Measure	How is the Hawkesbury performing?
1. Total greenhouse gas emissions from electricity and gas usage within council operations. 2. Council greenhouse gas emissions per resident.	Council's greenhouse gas emissions have remained stable between 2007-2008 and 2008-2009.

Current status and trends



Outcome 1



Outcome 2

Response to the issue

The Australian Government has released a National Greenhouse and Energy Reporting Measurement Guidelines (NGERS). The objectives of the guidelines is to set a criteria for the measurement of greenhouse gas emissions, the production and consumption of energy.

The Carbon Pollution Reduction Scheme (CPRS) is part of the Australian Government's strategy to reduce Australia's carbon pollution by 60 percent of 2000 levels by 2050.

The National Greenhouse and Energy Reporting Act will underpin the CPRS, providing the emissions data on which obligations under the CPRS will be based. NGER legislation will require amendments to allow for reporting under the CPRS. Not all corporations that report under existing NGER legislation will be subject to CPRS liabilities.

Council's Footprint

Councils are only likely to be directly covered by the CPRS if they operate a landfill, and the methane emissions from that landfill exceed the threshold set under the CPRS. (currently proposed to be 25 kilotonnes of CO2-e emissions)

Hawkesbury City Council owns and operates the Hawkesbury City Waste Management Facility and therefore is captured under the National Reporting scheme. Under this Act, Council must calculate by direct monitoring the emissions from the facility. These emissions added with the electricity and diesel used complete the total emissions.

Hawkesbury City Council has a solid historical record of its greenhouse gas emissions through its involvement in the Cities for Climate Protection Program, and more recently through its receipt of regular energy and greenhouse gas performance reports as part of its subscription to the Planet Footprint Program for Local Government.

Involvement in these initiatives has been driven primarily through a need to better improve energy performance within the organisation, and to influence the community to improve its energy performance, with the overall objective being to reduce greenhouse gas emissions from within Council and from across the wider Local Government Area.

Future directions

Hawkesbury City Council will continue to monitor and record its organisations environmental footprint eg waste, energy water, street lighting and fleet management to enable an accurate measure of our Green House emissions.

However, the continuous onsite direct monitoring of greenhouse gases eg methane, hydrofluorocarbans, nitrous oxide, perfluoro's and sulphur hexafluoride, needs to be implemented and recorded to ascertain the true landfill emissions.

The direct monitoring and the information obtained from Planet Footprint will further determine Councils ongoing registration under the NGERS Act.

Water

Introduction

The NSW Water savings initiatives were introduced by the NSW Government in May 2005. They were administered by the Department of Energy, Utilities and Sustainability (DEUS) who are now a part of the Department of Environment and Climate Change (DECC). The legislation requires certain businesses, government agencies and local councils to prepare Water Savings Action Plans by 2008. Hawkesbury City Council is required to develop a Water Savings Action Plan (WSAP) in accordance with the guidelines set out by the NSW Government.

The guidelines require Council to include the following in its WSAP:

- Details of baseline energy consumption
- Management review and associated management actions related to energy
- Details of audits and reviews carried out to identify energy savings opportunities; and
- Actions for implementation

The WSAP is focused on the top ten water consuming sites operated by Council. This document has been developed to meet the requirements for development of a WSAP, and includes the following sections:

- Baseline water performance data for all Council properties
- Management review outcomes
- Management actions
- Energy savings measures; and
- Associated background information

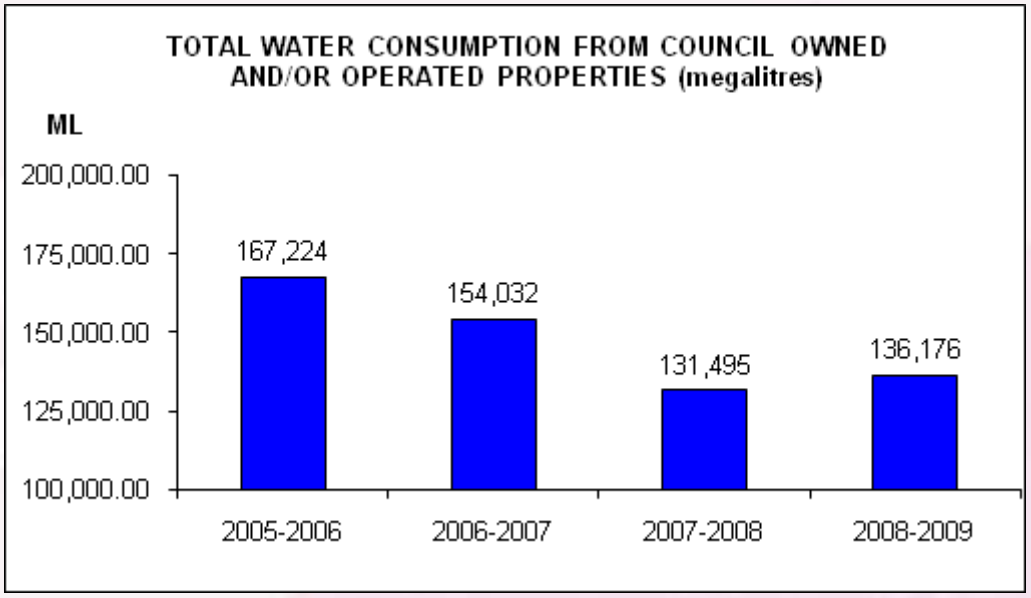
Measures of Performance

Measure	**How is the Hawkesbury performing?**
1. Total water consumption 2. Water consumption per resident.	 Council water consumption has decreased or stabilised every year since 2005-2006.

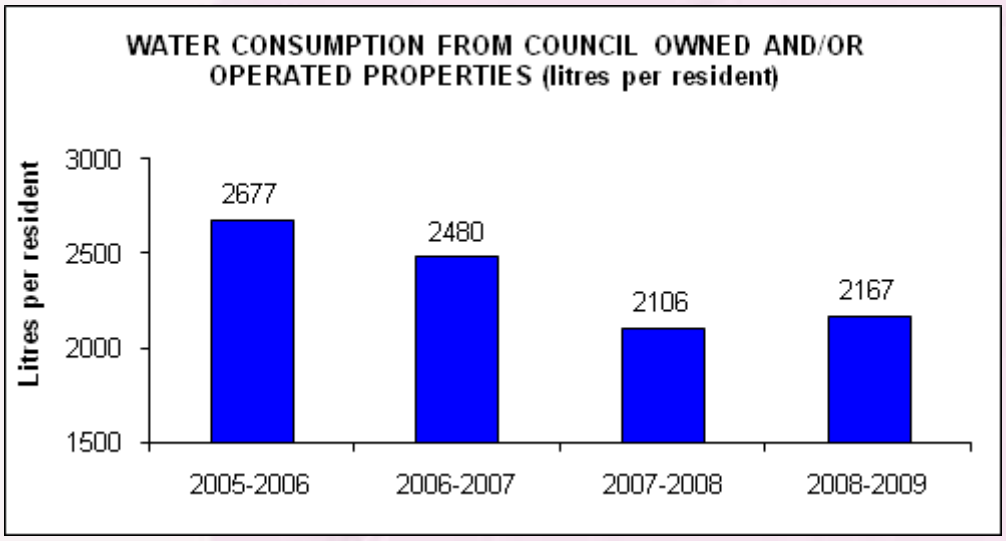
Council subscribes to an independent environmental score keeper, Planet Footprint, who captures and monitors data on waste, energy, water, street lighting, fleet management and greenhouse gas emissions.

Current status and trends

Council's water consumption has decreased every year since 2004-2005, with a significant decrease recorded between 2006-2008. This is a combination of water restrictions, due to drought conditions and an ongoing commitment to water reduction.



Outcome 1



Outcome 2

Response to the issue

Council became a member of Sydney Water, “Every Drop Counts” Business Program in April 2007. This program has been exceptionally successful in locating leaks and faulty equipment at Council’s Richmond Swimming Centre and the Oasis Aquatic Centre. The program included an independent audit the Department of Commerce who installed an online water monitoring system which identifies water usage twenty fours hours a day. The inability to return to zero usage at any given time enabled Council to locate leaks and undertake appropriate works at both complexes, which saved thousands of litres of water and money going down the drain.

In terms of water abatement actions, key projects investigated recently include the recycling of swimming pool backwash water and obtaining free water efficient products from Sydney Water available to member councils. This would see a total of 19 AAA rated showerheads installed in Council buildings. Watering wands, 9L heavy duty lidded buckets, SaturAid granular soil wetter and Rainsaver water crystals to be used at Council's community nursery and on community planting days. Refer to “Possible Water Savings Actions by Site” at Appendix B for further opportunities.

Council has also incorporated energy efficient design into its new buildings, the most recent being the Deerubbin Centre, was opened in 2005 and the museum opened in 2008.

The Hawkesbury City Council’s, Water Savings Action Plan was approved by the Minister for Climate Change and the Environment on 1 April 2009. This Plan now becomes the blueprint for change within Council over the next four years. In particular, further monitoring of many sites will need to be carried out to ensure a better understanding of the water characteristics at those locations. An annual progress report on outcomes of the plan must be submitted to DECC, with a complete review by 2013.

Future directions

The Hawkesbury City Council’s Management Executive Team adopted the following actions, in September 2008 to enforce Council’s ongoing commitment to reducing energy across Council’s assets.

- Develop and implement an Operational Management Standard that effectively incorporates water, and infrastructure management issues to prioritise the strategic direction for the allocation of required resources.
- Examine the internal resources being applied to develop the “Resource Allocation Priority System” and processes, and set resources effectively to ensure the frameworks and processes can be implemented effectively.
- Ensure managers are fully aware of the importance of a strategic approach to energy management within Council.
- Develop and implement an overall process for regularly reviewing Council’s water performance in accordance with legislative requirements.
- Develop a central register of all environmental legal and other requirements including relevant legislation, codes of practice, community agreements, licenses and permits related to water management.
- Develop and implement a process for a consistent and effective method of communicating significant and relevant water management issues, and applicable regulatory requirements to key personnel.
- Develop broad and long term energy improvement objectives to provide strategic direction to the organisation’s water programs.
- Implement a simple and streamlined process to ensure management and staff consider the current water issues and associated indicators, objectives and targets, when developing the management and operating plans and budgets, to ensure these plans include strategic programs to address these issues and meet these objectives.
- Select appropriate persons from each division to represent that Division or Branch on the Internal Energy and Water Steering Team.

- Identify a staff member to act as the organisation's performance coordinator, to oversee the implementation and maintenance of water management frameworks and processes.
- Encourage staff to provide feedback on energy and water issues during team meetings, and to pass on important environmental information to staff as required.
- Develop procedures for dealing with internal requests for energy and water information, and train all staff (especially customer service staff) on these procedures. Document the process for internal and external energy and water related communication into a formal procedure and communicate to key personnel.
- Develop management system procedures to store reports and energy use information in a database for ready access.
- Develop a protocol to initiate prompt corrective action whenever personnel become aware of energy waste.
- Develop and implement an organisation-wide purchasing and procurement procedure that incorporates consideration of energy issues at all stages.
- Regularly monitor the energy use of major facilities, cost- centres or energy intensive end users.
- Adjust existing identification processes and forms to include environmental incident and non-conformance identification, including the reporting of energy 'issues'; and
- Develop, implement and document a process for the regular auditing of operations against controls and procedures developed to improve energy performance.

Possible Water Savings Actions by Site

Please refer to Appendix B - Possible Water Savings Actions By site from Water Savings Action Plan Revised September 2008.

Air Quality

Introduction

DECC's survey *Who Cares about the Environment in 2006* shows that air quality, along with water issues, continue to be the two most important environmental issues in NSW.

Action for Air is the NSW Government's 25 year plan for managing air quality in the Greater Metropolitan Region and was first released in 1998. Action for Air identifies photochemical smog (ozone at ground level) and fine particle pollution as the two main air pollutants of concern. Both these pollutants have significant health impacts. *Action for Air: 2006 Update* highlights recent Government initiatives and links to other strategies including the Metropolitan Strategy. *Action for Air.*

It also addresses the general need to protect air quality for all human and ecological purposes.

Local government is involved in the management of local air quality issues that arise from the impacts of activities and premises on their near neighbors. However they can also play an important part in managing regional air quality issues.

The major pollutants emitted by motor vehicles are hydrocarbons, nitrogen oxides, carbon monoxides, lead, suphur oxides, carbon dioxides and other particles.

The impact on air quality is increasing due to population growth and a continued reliance on motor vehicles as the primary source of transport in Western Sydney.

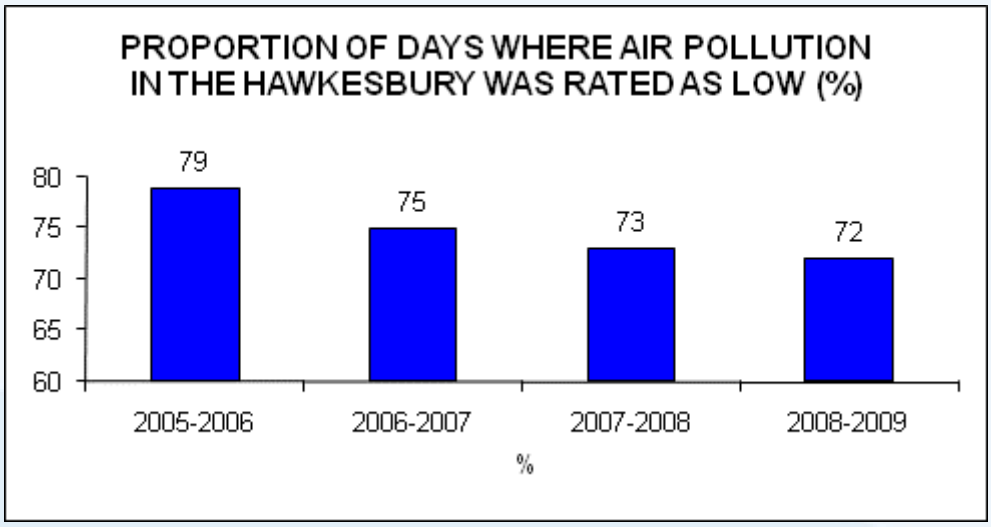
Other less significant contributors to air quality are; fires, and emissions from wood and other solid fuel heaters.

On a wider scale, energy consumption from residents and businesses in the Hawkesbury contribute to global greenhouse gas emissions through the associated burning of fossil fuels at electricity power stations.

Measures of Performance

Measure	**How is the Hawkesbury performing?**
1. Proportion of days during year where air pollution was rated as low (according to the Regional Pollution Index - North Western Sydney Region) (percent).	 The proportion of days where air pollution in the Hawkesbury was rated as high has decreased each year since 2005-2006.

Current status and trends



Outcome 1

The documented periods 2005 - 2006, 2006 - 2007, 2007 - 2008, 2008 - 2009 for air pollution incidents and requests for pile burns within the Hawkesbury City Council Local Government Area show no real consistency. Pollution incidents consist mainly of domestic wood heaters and those members of the public disposing of rubbish through incineration, these incidences occur at random and could occur at anytime throughout the year.

In the Hawkesbury City Council area, it is prohibited to burn in the open without approval, unless a pile burn application is made to Council and subsequently approved.

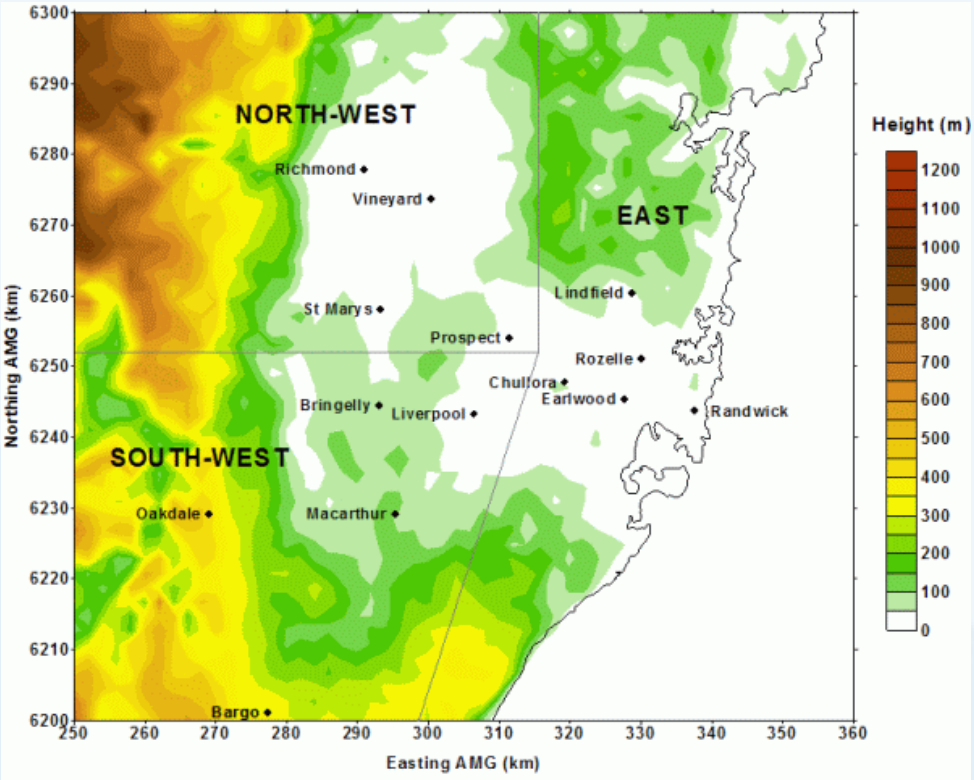
Given that the majority of properties exist on rural acreage within the Local Government Area applications for pile burns are made on a regular basis throughout the year. Approvals for pile burning are based on that the material being burned in dead dried vegetation from the property that it originated from with no other foreign substances included. Other criteria include that the piles of a certain dimension, and that the piles intended to be burnt are supervised and done so within specified hours.

Overall, air quality in the lower Hunter, Sydney and Illawarra regions has been steadily improving since the 1980's. In 1998, ambient air quality standards and goals for six pollutants were met in the National Environment Protection Measure for Ambient Air Quality (AAQ NEPHM). Concentrations are below their national standards. Currently some exceedences are associated with ozone and occur periodically for airborne particles.

Urban air pollution arises from emissions by major industry, motor vehicles, commercial operations, and leaking pipes and tanks, as well as from domestic activities such as using solid fuel heaters.

The proportion of days where air pollution in the Hawkesbury was rated as low, as a percentage, has remained reasonably constant since 2003/2004. Air quality standards for particles can be exceeded due to agricultural and hazard reduction burning, bushfires, and the use of solid fuel heaters in the winter months.

The high frequency of exceedences in the winter is due firstly to the fact that meteorological conditions, conducive to the trapping of fine particles occur frequently in winter and secondly to the comparative stringency of the fine particle visibility goal.



Air Quality Monitoring Sites

The Richmond air quality monitoring site is located inside the campus of the University of Western Sydney, Hawkesbury. It is situated in the north of the Hawkesbury basin in a residential/semi-rural area and is at an elevation of 21 metres. It is situated within the DEEC's North-west Sydney region. The Richmond site was commissioned in May 1992. Australian Map Grid (AMG) coordinates* (km): 6277.9 northing, 290.9 easting and zone 56.

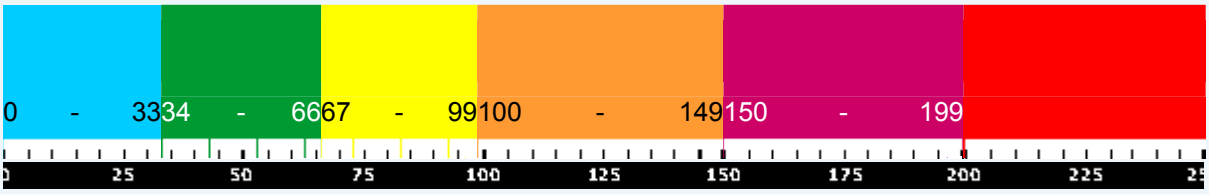
The Vineyard air quality monitoring site is located in the Riverstone Sewage Treatment Plant, off Bandon Road, Vineyard. It is situated in the north of the Hawkesbury basin in a residential/semi-rural area and is at an elevation of 35 metres. It is situated within the DEEC's North-west Sydney region. The Vineyard site was commissioned in February 1994. Australian Map Grid (AMG) coordinates* (km): 6273.7 northing, 300.3 easting and zone 56.

The following air pollutants and meteorological variables are currently measured at Richmond and Vineyard:

- O_3 ,NO, NO_2 & NO_x ,SO_2 ,Fine particles (by nephelometry)
- Fine particles ($PM_{2.5}$ & PM_{10} using a tapered element oscillating microbalance)
- Wind speed, wind direction, ambient temperature, and Relative humidity

Data from this site are used in the Regional Air Quality Index.

Wednesday, 28 May 2008, 9 - 10 am



Response to the issue

Council is working to improve air quality in the Local Government Area in two ways.

At the present time Hawkesbury City Council policy in relation to air quality relates to the issue of "backyard burning" whether the burning is in a residential area or on a rural property.

This is controlled through the enforcement of air quality regulations in relevant environmental legislation, such as the Protect of the Environment (Operations) Act 1997 and the Protection of the Environment (Control of Burning) Regulation 2000.

In the Hawkesbury City Council area, it is prohibited to burn in the open without approval.

Every resident is also required under the above regulation to burn or operate any fuel burning equipment in such a way and take all necessary actions to prevent or minimise air pollution. This obligation applies to all types of fires including BBQ's and home wood heaters.

DECC encourages and supports industry and the broader community to adopt cleaner air practices through a range of education and clean air initiatives.

AAQ NEPM sets the national health-based air quality standards for six air pollutants and, under the NSW State Plan, air quality targets for NSW are to meet NEPM standards by 2008.

Future directions

Methods at Council's disposal to assist in the maintenance of air quality within the Hawkesbury will include continual liaison with the Rural Fire Service in relation to requirements for permissible burns; continued compliance with Council's Open Burning Policy; and, legislative requirements through the Protection of the Environment (Operations) Act 1997 to control prohibited burning activities and pollution from domestic wood combustion heaters.

Climate Change

Introduction

Natural hazards are events and processes that can pose risks to life and property. They include flooding and bushfire. Climate change has the potential to increase risks associated with these hazards.

The Hawkesbury-Nepean Catchment covers over 22,000 square kilometers. The catchment's natural landscapes are incredibly varied, from rainforests to open woodlands, heath lands to wetlands, and highland freshwater streams to the magnificent Hawkesbury River estuary. The catchment includes most of the Greater Blue Mountains World Heritage Area of over one million hectares of national park and reserves protecting diverse Eucalypt forests and exceptional native plants and animals. These contribute to the catchment's many unique and spectacular recreation and tourism opportunities.

The catchment has many major rivers, including the Hawkesbury, Nepean, Wollondilly, Mulwaree, Tarlo, Wingecarribee, Nattai, Nepean, Coxs, Kowmung, Grose, Capertee, Colo and Macdonald.

It is one of the most important and varied catchments in Australia, providing a substantial proportion of the drinking water supplied to the 4 million people living in Sydney, the Illawarra and the Blue Mountains. Almost 1 million people live in the catchment, of which 90% live in the suburbs to the west, northwest and southwest of Sydney. Over the next 30 years this population is expected to grow by more than 400,000. The economy of the catchment is driven by an extensive range of agricultural, extractive, manufacturing and processing industries.

Current status and trends

In November 2005 the NSW Greenhouse Plan was released. The Plan includes a range of actions aimed at adapting to climate change including research into the impacts of natural hazards and the development of guidelines to assist councils to incorporate climate change considerations into land use plans.

In February 2006, the Council of Australian Governments (COAG) announced its Plan for Collaborative Action on Climate Change. The COAG Climate Change Group is now currently preparing the National Climate Change Adaptation Framework. The Adaptation Framework is a way of preparing for a changing climate to manage the risks and maximise opportunities. Long term climate change is likely to present new challenges that will demand careful analysis and innovative solutions. As part of the state obligations to the COAG Plan for Collaborative Action on Climate Change, councils will be required to consider the National Climate Change Adaptation Framework and the NSW Greenhouse Plan.

The NSW State Plan states that NSW will achieve a 60 per cent cut in greenhouse emissions by 2050 and a return to year 2000 greenhouse gas emission levels by 2025. It also states that the NSW Greenhouse Gas Abatement Scheme will be extended to 2020 and beyond unless and until a National Emissions Trading Scheme comes into effect; and NSW will continue to lead the work of States and Territories on the National Emissions Trading Taskforce.

Higher temperatures will lead to inadequate winter chilling for some fruit trees, which may reduce fruit yield and quality (Hennessy and Clayton-Greene, 1995). It may become necessary to consider low chill varieties and alternative management options. However, higher temperatures are likely to reduce the risk of damaging winter frosts. In viticulture, higher temperatures are likely to reduce grape quality, but there may be opportunities to shift production to varieties better adapted to warmer conditions (Webb, 2006).

The key consequence of climate change on farming will clearly be rainfall. Any reduction in rainfall will place most farms under stress, particularly when linked to higher temperatures.

For dry land cropping, reductions in rainfall and increases in evaporation directly contribute to reductions in soil moisture. Meanwhile, irrigated agriculture is likely to be affected by tighter constraints on water allocations possibly resulting in a more developed and competitive water market. In this sense, the unusually hot droughts of 2002/03 and 2005/06 may be a sign of things to come. Furthermore, heavy rains and winds from storm events also contribute to crop damage and soil erosion. Indirect impacts due to changes in weeds, pests and international markets may also place farms under stress.

Various studies of stream flows in NSW indicate that climate change is likely to reduce flows in the future (Hassall and Associates, 1998; Jones and Page, 2001; Beare and Heaney, 2002; Bates et al., 2003; Warner, 2003). This has implications not only for water users within the catchment, but also for neighboring Sydney, which derives the majority of its drinking water from the Hawkesbury-Nepean Catchment. Under the National Water Initiative, the Commonwealth, State and Territory Governments have agreed that water users should bear the risk of such reductions in water availability. In addition, changes in flows of the Hawkesbury River may affect navigation along the waterway.

Lower flows and higher temperatures may also reduce water quality within the catchment. For example, low flows, higher temperatures and elevated nutrients create a more favorable environment for potentially harmful algal blooms.

Greater fire activity could contaminate water catchments with sediment and ash. Salinity problems in the catchment may be exacerbated by changes in rainfall, temperature and stream flows (Beare and Heaney, 2002). In addition to effects on surface water, the quality of coastal groundwater aquifers may be adversely affected by rising sea levels and salt-water infiltration. Decreases in runoff due to climate change may reduce the extent and function of freshwater wetlands, such as Longneck Lagoon, as well as the Hawkesbury Estuary, that provide habitat for birds and other wildlife.

The built environment is also vulnerable to climate change. As well as impacting on homes, it will affect infrastructure, commercial buildings and other physical assets. Changes in average climate will affect building design and performance, including structural standards and cooling and heating demand (PIA, 2004). Higher summer temperatures, for example, may induce a rethinking of building design and standards to ensure thermal comfort at minimal cost, while potential increases in extreme winds may necessitate more robust construction. In addition, a study by Austroads (2004) concluded that climate change would contribute to increases in road maintenance costs in NSW of up to 25% by 2100, largely due to assumptions about the effects of climate change and population growth on traffic volumes.

The risk of property loss due to bushfire is also likely to increase. For example, Richmond currently experiences approximately 12 days per year with a fire danger index of “very high” or “extreme.” This is expected to increase by up to 2 days by 2020 and up to 7 days by 2050 (Hennessy et al., 2005; see Table 2). As a consequence of these and other changes in extremes such as winds and floods, insurance risk assessments and premiums are likely to be affected.

Climate change is likely to lead to changes in the distributions of tree species, possible increased invasion by pests, and changes to the habitat that these areas provide for local plants and animals. This will raise new challenges in managing forest areas for biodiversity conservation.

Response to the issue

A number of green house reduction programs have now been implemented with the development of a Greenhouse gas reduction strategy reflecting Council's leadership in environmental management.

"In 2005/2006 Hawkesbury Council was one of the 166 councils whose contributions enabled Australian councils to reduce greenhouse gas emission of almost 2.9 million tonnes in carbon dioxide.

In late 2005 Council adopted Energy and Water Saving Action Plans that have assisted in improvement in water efficiencies and energy consumptions.

Climate change will have both positive and negative impacts on the types of crops that can be grown and on agricultural productivity. For example, higher levels of carbon dioxide in the atmosphere are likely to increase plant growth, but the protein content of those plants is expected to be lower. Low to moderate warming will also help plant growth and extend growing seasons, but a rise in the number of very hot days or droughts could damage crops.

Dry land grazing (sheep and beef cattle) and broad acre cropping are also likely to benefit from higher carbon dioxide levels, but this may be offset by the effect of higher temperatures (Hassall and Associates, 1998). For example, warmer temperatures will increase heat stress on livestock (Howden et al., 1999a; Jones and Hennessy, 2000), which may affect growth and productivity and, subsequently, livestock management. Changes to the climate will have significant effects on the catchments plants and animals. Currently, 245 species, ten populations and 32 ecological communities (i.e., collections of species or habitat) in the catchment are classified as threatened or endangered (DEC, 2006). Although current threats to the catchments biodiversity are largely a product of historical land clearing, climate change is likely to increase the need for conservation efforts.

The geographic distribution of a species is often defined by its 'climate envelope,' reflecting species-specific tolerances to extremes of temperature and moisture. Climate change is likely to drive changes in the distribution of some plant and animal species, driving some species out of the catchment or enabling invaders to move in. Meanwhile, even those species capable of coping with climate change alone may succumb to the cumulative effects of multiple stressors. Despite such impacts, little is actually known regarding how climate change may affect some of the catchment's endangered iconic species such as the Swift Parrot, Gang-gang Cockatoo and the Southern Brown Bandicoot or ecosystems such as the Blue Gum High Forest, or the Castlereagh Swamp Woodlands.

Adaptation is a risk management strategy involving actions to reduce the negative impacts of climate change and take advantage of new opportunities that may arise. The types of adaptation measures adopted will vary from region-to-region. Because some of the decisions we make today will have lasting implications for future climate vulnerability, we must start planning our adaptive responses now. By doing so, we may help to lessen some of the environmental, economic and social costs of climate change.

Planet Footprint provides Hawkesbury City Council with a full independent monitoring and reporting of the energy and greenhouse gas (scope 2) emissions at our individual facilities. A summary of the Energy & Water Consumption and Greenhouse Emissions are provided quarterly or online upon demand.

Other monitoring and reporting currently being undertaken to obtain Council's environmental footprint include: -

1. Online water usage calculator provided by the Every Drop Counts Sydney Water Business Program. Reports are currently available for:

    - Oasis Swimming Centre
    - Richmond Pool

2. Water and Energy Savings Action Plans, which focus on the top ten consuming sites, operated by Council with annual progress reports on the outcomes of the Plan submitted to DECC and the Plans reviewed every four years.

   - Water Savings Action Plan Annual Report Due 30 June 2010
   - Energy Savings Action Plan Annual Report due 31 December 2009

Future directions

Councils in Western Sydney need to prepare for the anticipated impacts of Climate Change by providing the best possible information and management tools appropriate for local government roles, management structures and responsibilities in the context of the Western Sydney geographic region. With this in mind WSROC has proposed a regional approach to produce an adaptation plan for western Sydney.

The project should begin by late 2009 with a report due by late 2010 to mid 2011.

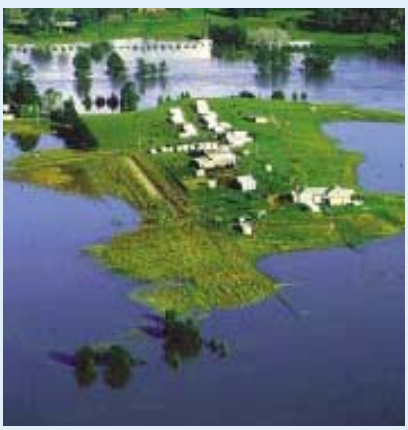
The project would meet individual council needs with regard to Climate Change Adaptation, while also identifying where regional responses are necessary. The most current scientific information will be used to describe vulnerabilities, identify risks and develop strategies to manage this risk and adapt council processes. Vulnerability assessment will involve downscaling of data to a regional level and modelling to account for topography, vegetation cover and built form.

Council at its meeting 29 July 2009 resolved that Council:

" 1. Provide WSROC with an Expressions of Interest that such a project is worthwhile and suggest that funding shares for individual Councils should at least partly reflect population and the level of Financial Assistance Grant received by each Council.

2. Consider funding a Regional Climate Change Risk Assessment and Adaptation for Councils in Western Sydney, contingent upon the ultimate research design; the commitment of other councils to the project and financial constraints at the time the project is fully developed."

WSROC on behalf of the Climate Change Working Group has applied for further grant funding under the Environmental Trust Research Program for $100,000.00. The CSIRO is contributing research as a major partner in the project. If successful stage one is to commence on March 2010 with stage three being completed by June 30, 2011.



Hawkesbury in flood (1988)

Salinity

Introduction

Salt is a natural part of the landscape in Western Sydney and is found in the rocks, soil and shallow groundwater of the region.

Changes in land use over time have caused salts normally stored in soils and rocks to be dissolved in water and brought to the surface. When the water evaporates, the salts concentrate at or near the lands surface, and salinity can become a problem. Salinity in an urban area is referred to as Urban Salinity.

Salinity affects plant growth and can damage tree, lawns, gardens and playing fields. However, salt also affect bricks and concrete, so in urban areas salinity can cause damage to buildings, paving, walls, even underground pipes and roads.

If not properly protected and managed, salinity damage could result in increasing costs to homeowners, councils and the community.

Measures of Performance

Measure

1. Area of constrained land (including acid sulphate affected land, flood prone land, land subject to steep land restrictions, contaminated land, endangered ecological communities) .

How is the Hawkesbury performing?

There has been no significant change in area per resident between 2005-2006 and 2008-2009.

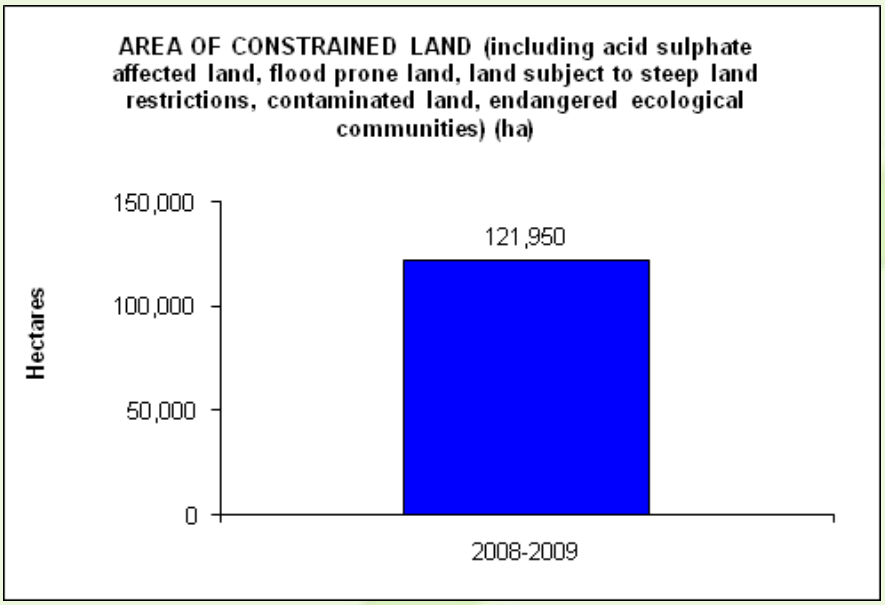
The current method of calculating salinity is deci - Siemens per metre (dS/m), micro - Siemens per centimetre (EC units) or parts per million (ppm) Total Dissolved Solids mg/l.

Approximate water quality bench marks in dS/m

Distilled Water	0	Production declines in cattle	11.4
Tastes salty	1.7	Production declines in sheep	15.7
Maximum for people	2.5	Most southern NSW groundwater	1-40
Limit for mixing herbicides	4.7	Seawater	55+

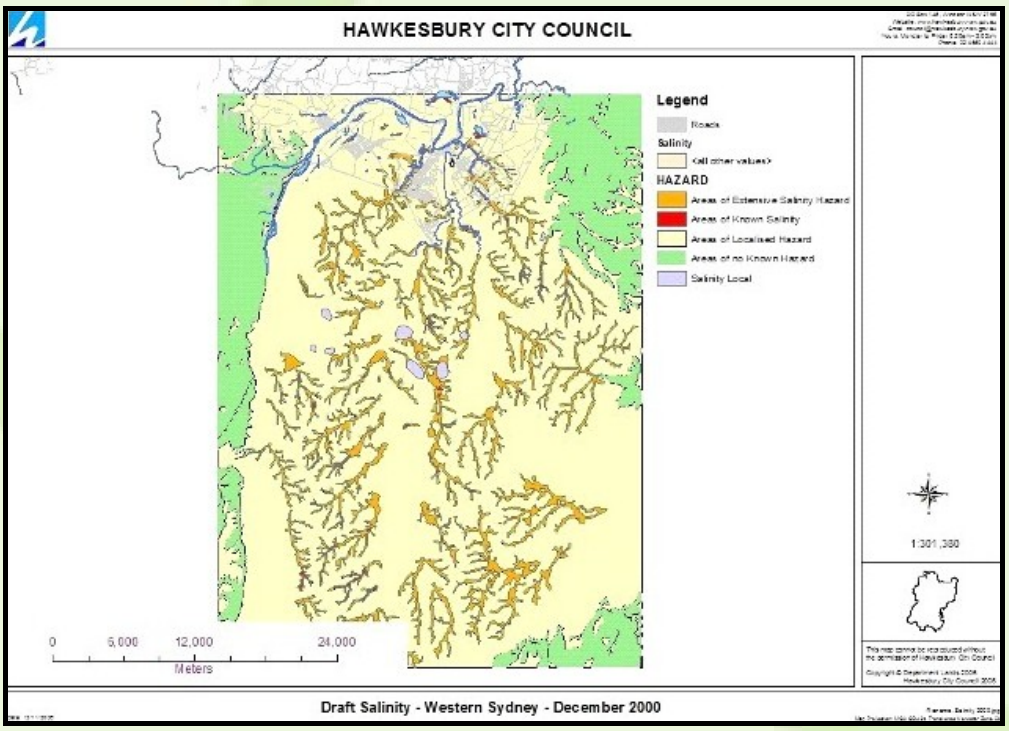
Converting units: 1dS/m = 1000 EC (micro- siemens = 640ppm

Current status and trends



Outcome 1

Areas of extensive salinity hazard	111.0029 sqkm
Areas of known salinity	16.005 sqkm
Total salinity affected area	127.034 sqkm



With urban development and the construction of roads, houses and drainage, the landscape has changed from native vegetation to hard surfaces and gardens, This has changed the way water and salt moves through the environment and where it concentrates.

In the urban areas of Hawkesbury City Council there are lots of additional sources of water to dissolve and move salts. These include leaking water, stormwater and sewer pipes, leaking pools, onsite septic systems and water from over watering of lawns, gardens, parks and sporting fields.

Response to the issue

Salinity is an important environmental issue across the State and the Department of Planning have been working with local council's to include a standard clause in the Local Environmental Plans in attempt to deal with this issue in urban and rural areas. The following example has been developed as a new standard provisions for built areas:

Objective: To minimise disturbance to natural hydrological systems as a result of development and to provide for appropriate management of land affected by salinity.

This clause applies to all land used or proposed to be used for residential, rural residential, commercial, industrial, recreation or other urban purposes.

Before granting consent the council must:

(a) Assess the likely impact of salinity on the proposed development

(b) Assess the likely impact of the proposed development on salinity processes

(c) Be satisfied the measures adopted to avoid or mitigate the impacts identified in (a) and (b) are adequate for the Hawkesbury.

The Department of Infrastructure, Planning and Natural Resources, now known as the Department of Conservation and Climate Change has produced a number of booklets as part of the Local Government Salinity Initiative series to assist in understanding salinity processes and the impact of development on salinity.

Hawkesbury City Council is also an active member of WSROC Salinity Working Party. This group meets four time a year to discuss regional opportunities and keep up dated with emerging technology. This group also coordinates a Salt Conference every second year with themes relating to current impacts for Local Government and their residents.

In August 2007 Hawkesbury Council in conjunction with TAFE and Department of Environment and Climate Change conducted a training course on the impacts of Salinity on the built environment. This course covered:

- The salinity cycle
- Potential costs and cost saving of dealing with salinity issues in the construction industry
- Solutions to reduce the impacts of building in a saline environment; and
- Current legislation and related information

This training was targeted to council assessment officers, engineers and environmental officers and external builders which also provided points for their association accreditation.

Future directions

New urban mapping for Salinity is being currently completed by the DECC This time it should cover most of the Hawkesbury Local Government Area.

Ongoing training is to be provided to council officers and external people in the building trade to keep updated with leading technology.

New standard LEP provisions will trigger the requirement for “Salt Plans” to be submitted for development being carried out in salt affected areas, protecting natural and built environments.

Individuals and communities can also make a significant impact on salinity through their approach to gardening and the way they do things around the house. Some of the main actions that can be done include:

- Ensure your house has an effective, well maintained damp proof course
- Maintain guttering, downpipes and good drainage on your property
- Fix any leaking pipes
- Use appropriate native plants in your garden that require little water and are salt tolerant; and
- Do not waste water by over watering gardens and lawns

These easy steps can be provided in easy media eduction for the community and could help reduce salinity problems in the Hawkesbury.

Urban Mapping highlights areas adjacent to the Hawkesbury River as "extensive salinity hazard".

Chemical Contamination - Land

Introduction

The Department of Environment Climate Change and Water (DECCW) keeps a record of contaminated land. Section 60 of the Contaminated Land Management Act 1997 (CLM Act) requires that the DECCW be notified of contamination. People may also report land contamination or pollution incidents by contacting the DECCW.

The DECCW determines whether contamination is significant enough to warrant regulation under the CLM Act. In making this decision, DECCW considers a range of factors, including those listed in section 12 of the CLM Act.

The DECC is also able to issue management orders or agree to appropriate voluntary management proposals subject to conditions, which anyone can put forward. In some cases it may be decided that the contamination risks can be addressed through the planning process, in which case regulation under the CLM Act may not necessarily be required. The DECC is required under the CLM Act to have regard to the 'polluter pays' principle in pursuing the investigation and clean-up of contaminated land

Measures of Performance

Measure	**How is the Hawkesbury** performing?
1. Recorded sites under Section 58 Contaminated Land Management Act	The number of identified sites has remained stable.

The above measure of performance is used by the Hawkesbury City Council through the implementation of the Development Control Plan.

Measure	**How is the Hawkesbury performing?**
2. Number of schedule premises within the Hawkesbury Local Government Area	The number of Schedule premises have decreased.

Measure	**How is the Hawkesbury performing?**
3. Number of pollution incident reports received by the DECCW Pollution Hotline.	Number of incident reports received remains stable.

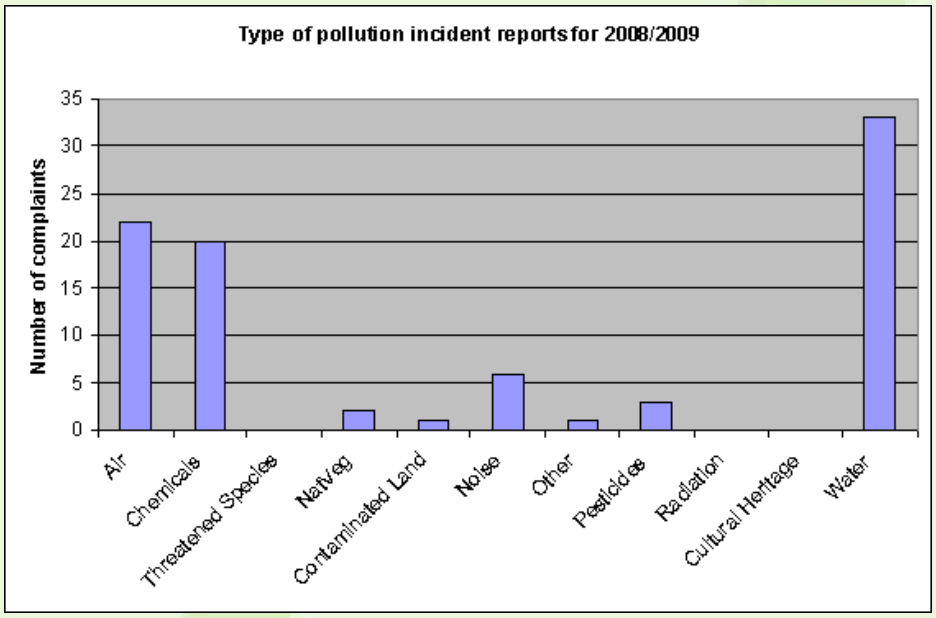
Measure

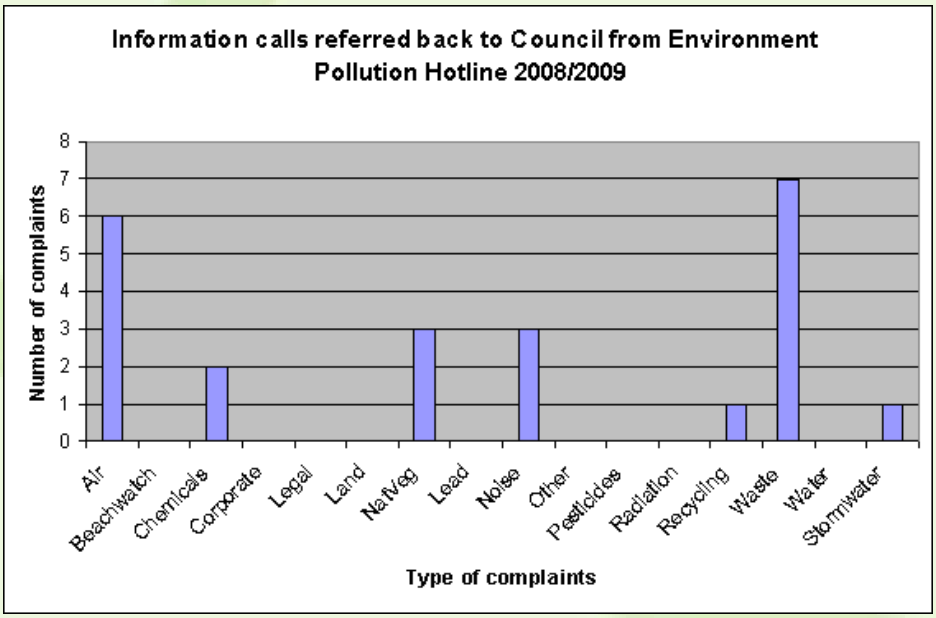
4. Information calls referred back to Council from the DECCW Pollution Hotline.

How is the Hawkesbury performing?

Number of calls referred remains stable.

Current status and trends





Council relies on the information contained in the DECCW "Search the contamination Land Records":

Sites affected by a Declaration Notice include:

1. 501 Bells Line of Road, Kurmond
2. Lot 9 DP 260028, Box Avenue, Wilberforce
3. Lot 21 DP 260028, Box Avenue, Wilberforce

Sites recently issued with a Revocation Notice include:

1. Lot 24 Pitt Town Bottoms Road, McGrath's Hill
2. 31 Groves Ave Mulgrave.

There are thirty one schedule premises in the Hawkesbury Local Government Area. This number consists of private, Local and State Government owned sites. The number of Schedule premises has declined from 78, due to the changes in the Protection of the Environment Operations Act.

Guidelines have been developed or approved by the DECCW. They are also used by contaminated land consultants in undertaking investigation, remediation, validation and reporting on contaminated sites.

Guidelines made by DECCW include:

- Guidelines for Assessing Service Station Sites, December 1994
- Guidelines for the vertical mixing of soil on former broad-acre agricultural land, January 1995
- Sampling Design Guidelines, September 1995
- Guidelines for Assessing Banana Plantation Sites, October 1997
- Guidelines for Consultants Reporting on Contaminated Sites - September 2000
- Guidelines for Assessing Former Orchards and Market Gardens, June 2005 -
- Guidelines for the NSW Site Auditor Scheme (2nd edition), April 2006
- Guidelines for the Assessment and Management of Groundwater Contamination, March 2007; and
- Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997, June 2009

Note: All references in DECC's contaminated sites guidelines to the Australian Water Quality Guidelines for Fresh and Marine Waters (ANZECC, November 1992) are replaced as of 6 September 2001 by references to the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC and ARMCANZ, October 2000), subject to the same terms.

Response to the issue

Hawkesbury City Council's Development Control Plan: Contaminated Land Policy, forms the basis for the management of land contamination within the Hawkesbury City Council area. The plan is made as a policy under the Managing Land Contamination: Planning Guidelines and State Environmental Planning Policy No 55- Remediation of Land (SEPP 55) in order to implement a contaminated land management framework within the Hawkesbury City Council area. It applies to all land within the Hawkesbury City Council area.

The aims of the plan are:

1. Ensure that changes of land use will not increase the risk to health or the environment
2. Avoid inappropriate restrictions on land use, and
3. Provide information to support decision making and to inform the community.

Future directions

In determining all rezoning, subdivision and development applications, Council must consider the possibility of land contamination and the implications it has for any proposed or permissible future uses of the land. A precautionary approach will be adopted to ensure threat any land contamination issues are identified and dealt with early in the planning process.

Acid Sulfate Soils

Introduction

As with salinity, the soils in Western Sydney are potential Acid Sulphate Soils (ASS) due to their nature and formation. They are also directly affected by development.

Acid sulphate soils are widespread in our estuarine floodplains and coastal lowlands (including mangrove tidal flats, salt marshes and tea-tree swamps). At this stage, they are termed potential acid sulphate soils. Actual acid sulphate soils are formed when the naturally occurring iron sulphides (pyrite) in the soil become exposed to air (through drainage or excavation) and subsequently oxidise, forming sulphuric acid.

Measures of Performance

Measure	How is the Hawkesbury performing?
1. Not increasing area affected by acid sulphate soils.	 This measure of performance is used by the Hawkesbury City Council through the implementation of the Local Environmental Plan.

Current status and trends

The trend is stable because the good quality information on the location of potential acid sulphate soils, combined with the planning and management measures that have been developed, means that the creation of actual acid sulphate soils can be avoided.

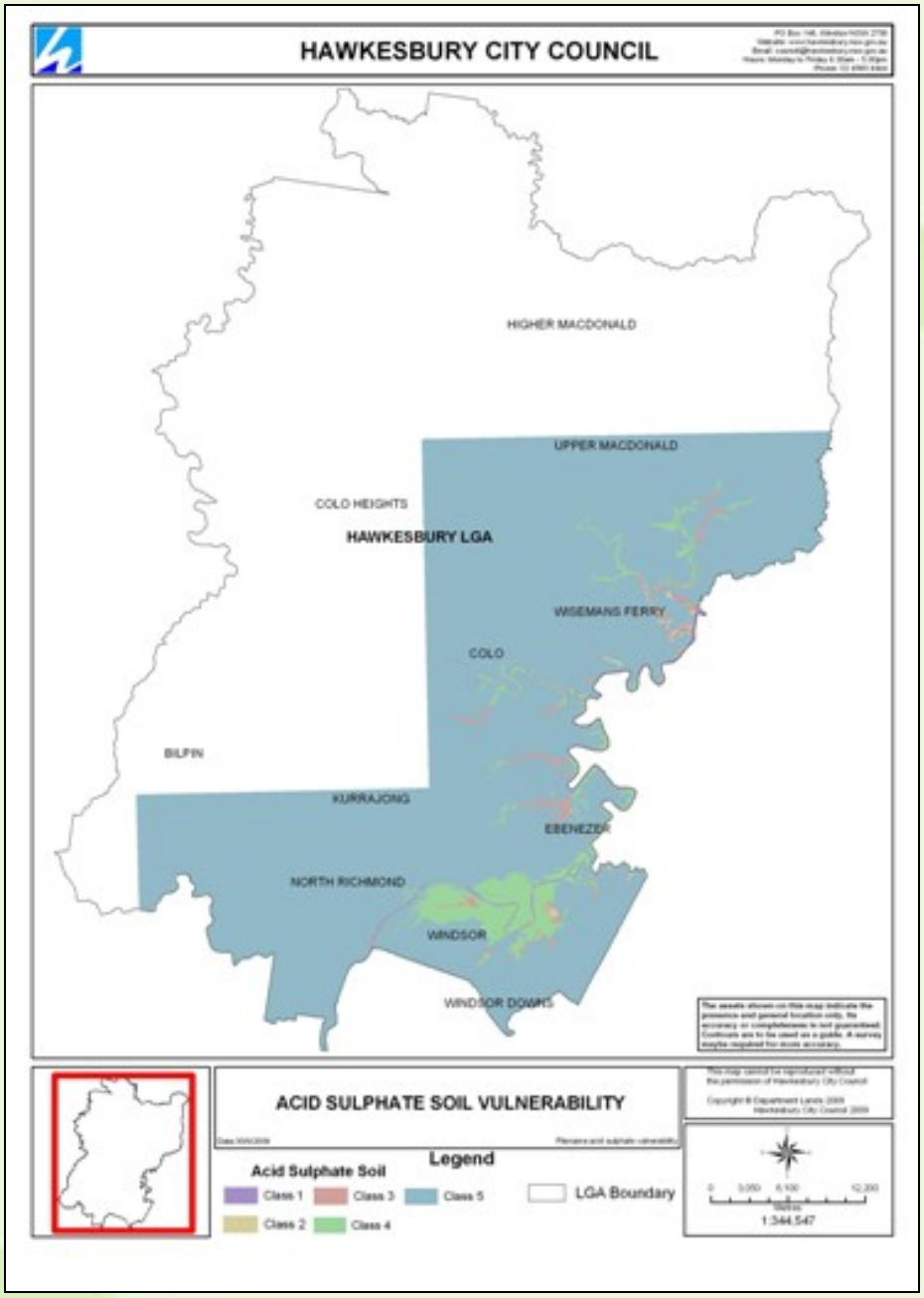
Response to the issue

Land that may contain potential acid sulfate soils has been identified from maps provided by the former NSW Department of Land and Water Conservation. These maps, known as Acid Sulfate Soils Planning Maps, establish 5 classes of land based on the probability of acid sulfate soils being present (Class 1 being the most likely and Class 5 being the least likely).

Hawkesbury City Council's Local Environmental Plan 1989- updated December 2008 clause 37A stipulates a person must not, without the consent of the Council, carry out works described in the following table:

Class of land Works

Class 1:	Any Works
Class 2:	Works below the natural ground surface
	Works by which the water table is likely to be lowered
Class 3:	Works beyond 1 metre below the natural ground surface
Class 4:	Works beyond 2 metres below the natural ground surface.
Class 5 :	Works within 500 metres of adjacent class 1,2,3 or 4 land which are likely to lower the watertable below 1 metre AHD on adjacent Class 1,2,3,or 4 land.



Acid sulphate soil vulnerability map

The map does not describe the severity of acid sulfate soils in an area or on a particular site. It provides an initial indication that acid sulfate soils could be present on land.

For the purpose of the table works includes:

1. Any disturbance of more than one tonne of soil (such as occurs in carrying out agriculture, the construction or maintenance of drains, extractive industries, dredging, the construction of artificial water bodies (including canals, dams and detention basins) or foundations, or flood mitigation works), and
2. Any other works that are likely to lower the watertable.

Future directions

The continued approach will limit environmental degradation from acid sulphate soils:

1. Minimise the disturbance of potential acid sulphate soils associated with drainable systems and urban development;
2. Local Environmental Plans providing the planning framework within the Hawkesbury Local Government Area.

Preliminary assessment is required for those development applications seeking consent for works described and proposed to be located on land classified vulnerable. An acid sulfate soils management plan is obtained if required and apply best management guidelines for rectification. Acid Sulfate Soils Assessment Guideline, August 1998, which forms part of the Acid Sulfate Soils Manual.

The ASS Manual developed by the Acid Sulfate Soils Management Advisory Committee (ASSMAC) and provides advice on best practice in planning, assessment and management of activities in areas containing acid sulfate soils.

Regulatory Responses to Non Complying Developments

Introduction

Council responds to a wide range of non complying development matters ranging from Development without consent, Development not in accordance with consent, complaints or enquiries made at Council include such as building works, earthworks and tree removal.

Council is considered as the Appropriate Regulatory Authority (ARA) for non complying development matters for enquiries that occur within the Local Government Area (LGA) with the exception of premises that are licensed with the Department of Environment and Climate Change Water (DECCW), known as scheduled premises.

Council's primary means of dealing with non complying development issues in the LGA is via education and or enforcement using relevant sections of the Environmental Planning & Assessment Act 1979, The Protection of Environment (Operations) Act 1997 and the Local Government Act 1993 which gives Council powers to control such non compliances.

Measures of Performance

Approximately 120 non complying development matters have been received and investigated by Council over the past 12 months. This is a new performance measure and previous records are not available.

Response to the issue

Data management practices are constantly being improved to ensure that all staff within Council, that deal with non complying developments complaints, record information correctly on a database system.

Future directions

Along with reviewing Council's current Enforcement Policy, there is a need to develop a standard priority assessment of non complying developments, while continuing to provide additional training to administration and regulatory staff addressing such matters.

Council will continue to use a database system, which allocates timeframes for responses to non complying development complaints and records actions taken during the investigation process.

Council continually seeks to improved methods to provide an effective response and excellence in customer service to the general public through training of Council staff on new and upcoming legislative requirements and development of improved internal procedures when dealing with non complying developments.

Water Quality

Introduction

Plant and animal species in and along water ways are affected by the introduction of excess nutrients and pollutants from nearby developments and agriculture.

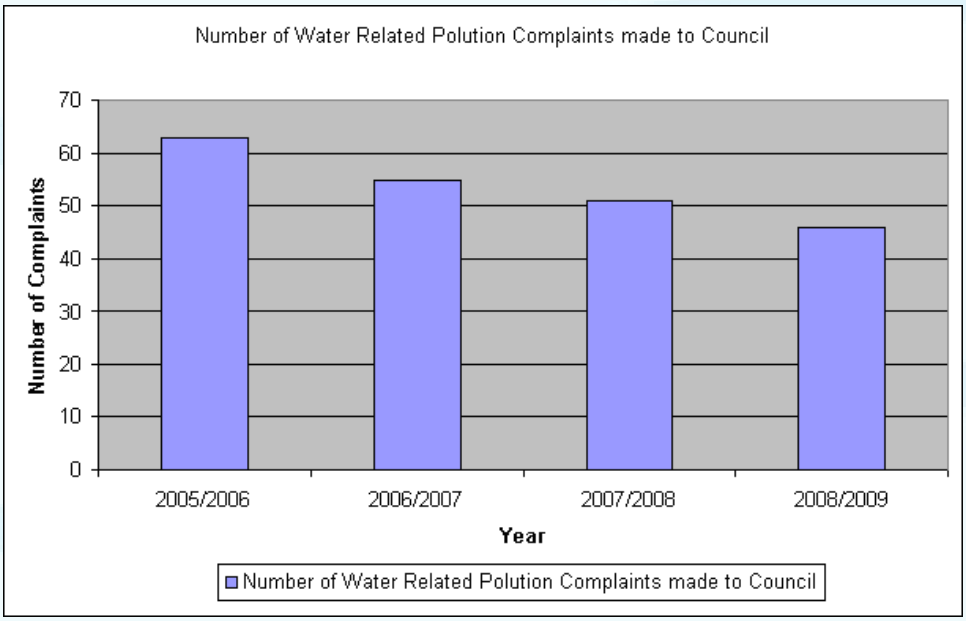
In particular, the Hawkesbury River has been subjected to several outbreaks of noxious aquatic weed, *Salvinia molesta*. Salvinia weed may trigger fish kills through the lack of oxygen and/ or toxic blooms, with infestation exacerbated by high nutrient levels and low river flows.

Council has the ability to enforce water pollution incidents that occur throughout the Local Government Area (ARA) by using legislative requirements through the Local Government Act 1993 and the Protection of the Environment (Operations) Act 1997.

Measures of Performance

Measure	**How is the Hawkesbury performing?**
1. Number of pollution complaints received by Council.	Number of complaints received is slowly declining.

Current status and trends



The reporting periods 2005/2006, 2006/2007, 2007/2008, and 2008/2009 revealed a consistent amount of water pollution related complaints made to Council. Complaints were as a result of on-site wastewater management facilities failing, incidences of abnormal water quality (algae blooms), and industrial commercial water pollution reported to Council.

Weed coverage in the Hawkesbury River Picture taken from the Confluence of South Creek looking to Windsor Bridge.

Storm water can be a source of pollution to receiving waters

Response to the issue

Council works in cooperation with other river stakeholders, to proactively manage the water ways in a coordinated and strategic way. Council has previously carried out monitoring of water quality in the river, but ceased this work during 2005-2006 to re-determine where best to direct funding, support and expertise for more effective river health outcomes. Future monitoring of the tributaries flowing into the Hawkesbury River was re-established to monitor river health.

Council has been undertaking a monitoring program of the tributaries of the Hawkesbury River.

The objectives of the Stormwater Water Quality Monitoring Program are to:

- Determine whether Council's Septic Safe Monitoring Program has improved the water quality to receiving waters
- Provide timely and relevant water quality data for assessment and compliance officers to enhance decision making
- Provide water quality data to the community via Council's web site on tributaries flowing into the Hawkesbury-Nepean River
- The program is designed to improve water quality data across the City area and raise community awareness on valuable resources; and
- Identify possible sources of pollution and develop strategies to reduce such pollutants.

Six sites are being sampled in the Hawkesbury Local Government Area. It is proposed to compare results with the same data obtained from the 1996-2001 monitoring period. The trends in water quality may suggest that the Septic Safe programme has raised public awareness concerning responsibilities associated with on-site sewage disposal. Further composite data is required to monitor trends.

Programs to improve water quality and reduce discharge to the Hawkesbury River system include:

- An Effluent Reuse and Wetlands Scheme with an Aluminum Sulphate dosing facility for phosphorous reduction at McGrath's Hill Sewage Treatment Plant. The Scheme reduces nutrient discharge to the Hawkesbury River by 99% compared to the pre wetlands period

- An improved habitat for wildlife and an education and research facility for students and professional organizations also located at McGrath's Hill Sewage Treatment Plant; and

- 24 hour plant monitoring and control system for South Windsor Sewage Treatment Plant

Future directions

To ensure that the water quality within the Hawkesbury Local Government Area is maintained, Council will continue to liaise with relevant water catchment groups, local community groups and other government agencies. Other methods including investigation and enforcement using the Protection of the Environment (Operations) Act 1997 of water pollution enquires will also continue.

The NSW Diffuse Source Water Pollution Strategy was released in June 2009, providing a framework for reducing diffuse source water pollution. The Strategy builds on and supports a range of existing pollution actions, by setting management actions that stakeholders have committed to progress. Management actions that include targeted compliance audits and investigations may be an effective way of ensuring implementation and fostering attitudinal change.

Sydney Waters Replacement Flows project will provide up to 18 billion litres of highly treated recycled water each year to the Hawkesbury-Nepean River system. This will replace water currently released from Warragamba Dam to maintain environmental flows.

Construction started in May 2008 and is expected to take about two years. Highly treated recycled water from the St Marys Recycled Water Plant will flow to the Hawkesbury-Nepean River from 2010.

Flood Plain Management

Introduction

Hawkesbury City Council is responsible for local planning and land management in Hawkesbury River floodplain and surrounding areas between the suburbs of Yarramundi and Wisemans Ferry.

The topography of the area is very diverse ranging from fertile floodplains and wetlands, to undulating hills and heavily timbered ridges through to inaccessible mountainous regions dissected by steep gorges and towering escarpments. As a result of these geographic features, the Hawkesbury experiences regular flooding, often resulting in considerable disruption to commerce and damage to agriculture and property.

The unique characteristics of the Hawkesbury-Nepean flooding has been described as exhibiting a combination of the worst characteristics of riverine flooding (depth and extent), and the worst characteristics of flash flooding (rapid rise of floodwaters and limited warning time).

Measures of Performance

Measure	**How is the Hawkesbury performing?**
1. Responding to requirements of *Floodplain Development Manual: the management of flood liable land*, New South Wales Government, April 2005.	 Implementing the Floodplain Risk Management Process

In particular:

- Establishing a Floodplain Risk Management Committee
- Collecting flood related data
- Preparing a Flood Study
- Preparing a Floodplain Risk Management Study
- Preparing a Floodplain Risk Management Plan
- Implementing the Floodplain Risk Management Plan

Current status and trends

For significant flood events, the inflow from the Hawkesbury River and its tributaries exceeds the outflow through Sackville gorge causing the valley to fill. Flooding can be of great depth by comparison with other NSW coastal rivers and the difference in depths between major and extreme flood is greater than that which occurs elsewhere. Depths of over the floor Hawkesbury – Nepean River flooding for houses with floors at the current flood planning level (FPL) adopted by Council (i.e. 1 in 100 year flood level without any freeboard allowance) are approximately:

- 2 metres for the 1867 flood of record (i.e. about a 1 in 200 year flood event); and
- 9 metres for a Probable Maximum Flood event.

Many existing dwellings have floor levels, which are well below the current FPL. These dwellings would experience significantly deeper and more hazardous depths of flood inundation.

Isolation of towns essentially arises due to the historic settlement of the valley and that fact that the urban road network has not evolved or been designed for the purpose of evacuating the floodplain's communities. Under existing conditions, many of the local roads are cut early by mainstream flooding and/or local catchment flooding.

The present urban and rural population of the valley has had no experience of severe flooding, having only suffered events up to approximately a 1 in 40 chance per year flood since 1867. This lack of awareness will make evacuation all the more difficult and could increase the trauma that may be experienced by the floodplain communities in the event of a severe flood.

Response to the issue

Council has established a Floodplain Risk Management Committee. The Committee generally meets once every 2 months.

Council relies on flood related data and flood studies prepared by Sydney Water, internally by Council staff and external consultants. This includes flood levels and studies for the Hawkesbury-Nepean, Colo, and Lower MacDonald River. A Digital Terrain Model of the flood prone areas of the Hawkesbury was completed in 2008 with grant funding provided to Council under the Natural Disaster Mitigation Program.

Council's Floodplain Risk Management Advisory Committee are in the process of preparing a consultant's brief for a Floodplain Risk Management Study and Plan for the Hawkesbury River within the Hawkesbury Local Government Area.

Council has been successful in obtaining a grant under the State Floodplain Management Program to assist in the preparation of the Floodplain Risk Management Study and Plan.

Council does have flood related development controls in the Hawkesbury Local Environmental Plan 1989 (HLEP 1989) and Hawkesbury Development Control Plan 2002 (HDCP) which have been developed overtime and prior to the *Floodplain Development Manual: the management of flood liable land*. The current flood related development controls are substantially based on the 1 in 100 year flood event being the flood planning level.

Future directions

Floodplain Risk Management Study and Plan to be prepared and implemented.

Picture: South Creek / Jolly Frog Hotel, Windsor, 1978. Source: Council archives.

River Health

Introduction

The Hawkesbury-Nepean River is one of the longest rivers in Eastern Australia. The Nepean River rises near the Robertson in the Illawarra Range, 100km south of Sydney. Downstream from the junction of the Nepean and the Grose River, the river is called the Hawkesbury. Uses of water from the Nepean River and its tributaries include water for Sydney's domestic purposes, water supply for land holders along the river, irrigation, stock watering, recreation, habitats for aquatic flora and fauna and waste disposal.

Following the Sydney Harbour, the Hawkesbury River is subjected to the highest recreational fishing pressures in New South Wales. The river also supports a significant fishing industry, producing large quantities of prawns, oysters, fish and crabs.

The Hawkesbury–Nepean River and its catchments have high social and economic value and support significant agriculture, recreation and tourism in the sub region. Many of the river's tributaries flow through National Parks and bush land reserves and this contributes to the high water quality in many of these streams which allows for swimming and other primary contact recreation.

Waterways of the Hawkesbury-Nepean are also adversely impacted by a wide range of land uses. Storm water runoff from urban areas along with sediment and nutrient runoff from rural areas contribute to reduced water quality. Water quality is also adversely impacted by on-site waste water management systems as well as through discharges from sewerage treatment plants. Licensed surface water extraction to support agricultural production contributes to reduced stream flows.

The Department of Climate Change recently completed analysis from a number of sites with significant history of water quality monitoring. Many sites have been routinely monitored for water quality since the early 1980's highlighting long term trends in parameters.

Information gathered in this program allows them to demonstrate:

- Improvements in water quality in recent times. They are improvements from what was a relatively poor condition and water quality in many areas and still has a long way to go before meeting water quality objectives (eg. ANZECC/ARMCANZ Guidelines)
- Nitrogen levels are often well above ANZECC guidelines levels in many parts of the river system
- Increases in conductivity throughout the River
- Long term average flows at Penrith Weir have now consistently fallen below that of the unregulated Colo River for the first time since records began in the early 1900s
- Significant changes in blue green algal species composition, with non toxic species of *Aphanocapsa* largely replacing *Anabaena* and *Microcystis* as the dominant bloom species in the River
- The effects of individual sewage treatment plants can potentially be inferred from these data (eg Penrith Sewage Treatment Plan (STP) and changes in phosphorus levels at site N53 (BMG causeway downstream Penrith STP)
- Nutrient levels are still an important issue in South and Eastern Creeks (sits NS23 and NS081)
- Phosphorus levels have generally been declining throughout most of the river system. Levels downstream of Penrith STP remain elevated compared with those in many other areas of the system

- Nitrogen levels have declined at many sites throughout the river system. Exceptions to this are Sharpes Weir (downstream of West Camden STP) and Wallacia Bridge, where nitrogen levels (particularly inorganic nitrogen levels) appear to be increasing. Despite many decreasing still often remain above ANZECC/ARMCANZ guideline levels throughout the river system

- The tidal limit of the Hawkesbury River occurs at Yarramundi, approximately 140km upstream from the river mouth. The differences in community structure between sites therefore most probable reflect the importance of tidal influences in these areas. Other potential contributing factors include the effects of the Grose River inflow and/or the differences in microhabitat; and

- Sampling of fish in the Hawkesbury Nepean River has been inconsistent over the past 15 years. Most species still appear to be present in the river system. However difficult to be definitive about changes in the occurrence of rare species eg Macquarie Perch, or Australian Grayling.

Degradation of river banks

Measures of Performance

Measure	How is the Hawkesbury performing?
1. Index of river quality 2. River flow	Council has an effective set of indicators for rating the health of the Hawkesbury River.

Current status and trends

Measure 1

% of results within ANZECC Water Quality Guidelines

M

The Sydney Catchment Authority (SCA) is responsible under the Water Catchment Management Act 1998 (NSW) to manage and protect drinking water catchments, supply bulk water and regulate certain activities.

Manly Hydraulics Laboratory NSW Department of Commerce conducts river gauging on behalf of the SCA. They currently operate a gauge at Penrith Weir and Council is working to obtain this data to develop processes to track river flow over time.

No data is currently available to measure river flow for the Hawkesbury River. Council is working to obtain this data and to develop processes to track river flow over time.

The river receives large quantities of treated sewage generated from the south western, western and north western parts of the Sydney region and from the Blue Mountains.

Treated sewage, along with urban and other runoff causes some decline in water quality and affects the continuing use of the river as a recreational resource, a tourist attraction, a fishery resource, a source of both domestic and irrigation water and its ability to cope with any further waste water discharges.

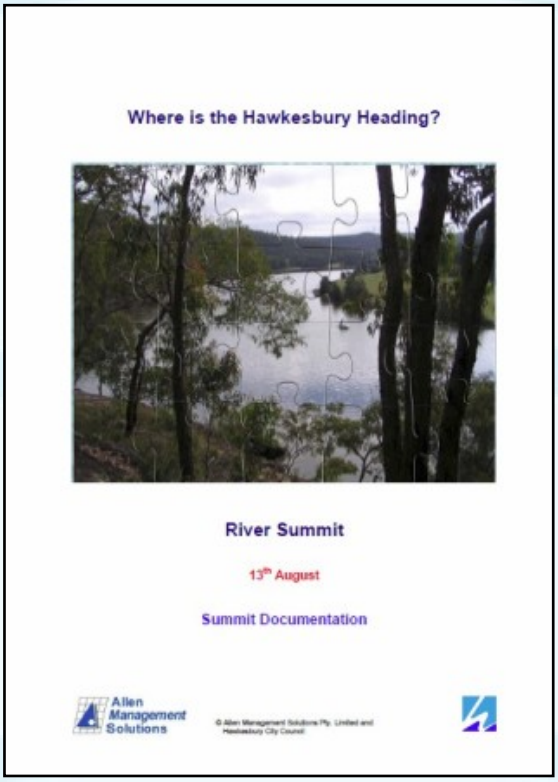
Response to the issue

As a partner to the Hawkesbury - Nepean Catchment Management Authority, Council has been involved to various degrees, in a range of river improvement projects, including bank stabilisation projects, revegetation projects, and salvinia weed management.

Council also liaises with local community groups involved in Sydney Water's Streamwatch initiative. Streamwatch is a network of schools, community groups, local government and other organisations that monitor water quality at sites across Sydney.

For some considerable time now Council has been expressing its serious concerns regarding the deteriorating condition of the Hawkesbury River and has been advocating for action to be taken to reverse current trends that are detrimental to the ongoing health of the river, which is one of Sydney's most important waterways.

Accordingly, Council at its meeting of 11 December 2007, resolved to conduct a River Summit with a view to investigate actions that can be taken to improve water quality, reduce and control weed infestation and enhance access to this most important community asset.



The River Summit was held on Wednesday 13 August 2008 at the Windsor Function Centre and attended by approximately eighty people. The summit documentation is available on Councils website.

There were many common themes that emerged from the group work on Solutions. They included:

- The River is already severely stressed and the threats are many and varied
- There is a shared desire to do something
- Population pressures mean that its plight will only get worse if something is not done
- The current approaches are not working and new approaches are needed
- There was a willingness to rise above some of the inter-agency and inter-government divisions to achieve better outcomes; and
- Every group indicated that they felt a Single River Authority was needed to pull together the efforts of the various stakeholders. All planning needs to be far more coordinated as the problems currently and in the future are inter-liked. And that, compliance and implementation needs to be far easier to do the right thing.

The greatest challenge will be how to fund the necessary investments.

Overall there was strong consensus that the range of problems had been articulated and that many elements of the potential solutions had been identified. It now needs some organisation, action and leadership to go to the next level.

The Hon. Nathan Rees, MP, Member of the Legislative Assembly, Member for Toongabbie, Minister for Emergency Services, and Minister for Water attended the Summit for part of the day.

Future directions

Premier Rees announced on 7 October 2008 to set up the "Office for the Hawkesbury- Nepean River" The Office will ensure that the management of the River is more coordinated and less complicated. It will provide a single point of contact for the community so that their questions or concerns about the River will be dealt with directly and effectively.

HAWKESBURY CITY COUNCIL

The Hawkesbury- Nepean River Act 2009 was gazetted on the 7 April 2009. The Act establishes a new Office of the Hawkesbury-Nepean, and gives it the power to coordinate the whole-of-government action needed to manage this critical and iconic waterway. The bill has four objectives and it gives the Office of the Hawkesbury-Nepean the clearly defined functions it will need to achieve each of those objectives.

Firstly, the Office will improve coordination and implementation of management strategies relating to the health of the Hawkesbury-Nepean river system. To achieve this, the Office will coordinate the management of aquatic weeds and manage the implementation of any agreed arrangements between New South Wales and the Commonwealth, or Local Government, to improve the health of the Hawkesbury-Nepean river system.

Secondly, the Office will improve public access to information and advice about management strategies concerning the health of the Hawkesbury-Nepean river system. To achieve this, the Office will act as a single point of information and advice about management strategies, respond to inquiries for advice and provide advice about management strategies, and compile information on management strategies and provide that information to the public.

Thirdly, the Office will provide increased opportunities for the public to be involved in the development of management strategies to improve the health of the Hawkesbury-Nepean river system. To achieve this, the Office will carry out public consultation to determine the views of the public or stakeholders, and report to me, as the relevant Minister, and relevant public authorities on the results of any public consultation.

Finally, the Bill provides for the Office to improve the management of in-stream development in the Hawkesbury-Nepean waters.

The Bill provides for the Office to do this by liaising with planning authorities to ensure they fulfil their responsibilities in an integrated and efficient manner, providing information and assistance on development to members of the public who propose to carry out in-stream development, and accepting development applications for developments in the Hawkesbury-Nepean waters and forwarding them to the relevant consent authority, together with associated documents and fees.

On the 20th May 2009 the Parliamentary Secretary for Water announced details of a $77.4 million funding package to help restore the health of the Hawkesbury-Nepean River. This announcement allows Hawkesbury City Council to proceed with the South Windsor effluent re-use scheme.

The project will replace 0.1 gigalitres per year of potable water now being used for open space irrigation with treated effluent from the South Windsor Sewage Treatment Plant.

This will also reduce total nitrogen loads discharged into the Hawkesbury River system from the Sewage Treatment Plant by 0.44 tonnes per year.

A water treatment plant will be constructed at the existing South Windsor Sewage Treatment Plant as will a distribution system to supply the recycled water to Council Reserves and school grounds.

The Hawkesbury River Recovery Package is being delivered by the Office of the Hawkesbury Nepean River.

Sydney Water's Irrigation and Landscape Efficiency program is part of the overall package. Sydney Water will offer subsidised Irrigation and Landscape Assessments (ILAs) to Council.

Storm Water

Introduction

The Environmental Stormwater Program was adopted by Hawkesbury City Council as part of its Environmental Levy, on 24 June 2002.

Short term benefits will be achieved from changing people's behaviour through community education initiatives.

Overall program benefits will include improvements to local lifestyles and tourism as well as improved business, economic and community development.

Measures of Performance

Measure	How is the Hawkesbury performing?
1. Stormwater interceptor devices are maintained	Type of pollutants collected are monitored.

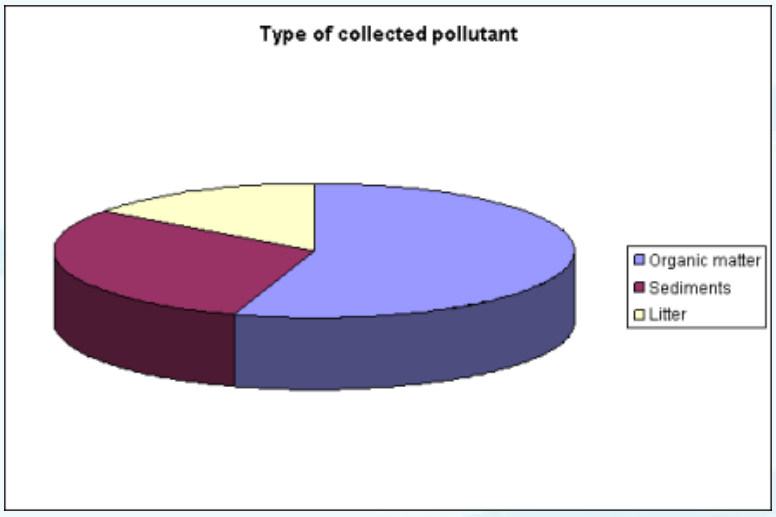
A total of twenty interceptor devices have been installed at suitable locations across the local government Area to collect pollutants before they enter waterways.

The amount and type of pollutants collected is monitored and these items are either recycled or disposed of to a landfill.

Current status and trends

Since installation 677.03 tonnes of material has been collected. Sediment, organic matter and litter comprised approximately of this matter respectively.

Organic Matter	55%	Sediments	30%	Litter	15%



Response to the issue

As of December, 2007 Council resolved that the Environmental Stormwater Levy cease with the remaining funds allocated to

- Gross Pollutant Trap operation and maintenance over an estimated 26 year period
- Mechanical street sweeper operation over and estimated 14 year period
- Integrated Weed Control funds to be utilised as matching funding for successful grants for weed control on Council owned/controlled land
- Road Reserve Management Planning- currently in progress
- Community monitoring of water quality- currently in progress; and
- Environmental Stormwater coordinator for six months implementation period.

Bligh Park Gross Pollutant Trap

Cleaning Castlereagh Road Gross Pollutant Trap

Biodiversity

Introduction

The Hawkesbury is one of the last Local Government Area's (LGA) that has substantial amount of intact bushland in the Sydney metropolitan area. These bushland areas provide habitat for the many threatened species that use these ecosystems. The information that has been collated to these figures has been taken from Department of Environment and Climate Change (DECC) wildlife atlas determine.

Council has a responsibility to maintain these ecosystems in terms of pest species control, erosion rehabilitation. Currently Hawkesbury has some of the most pristine Cumberland Plain Woodland in the Sydney Basin - an Endangered Ecological Community, upon which Council has a responsibility to protect along with the many other threatened Vegetation Communities that exist in the Hawkesbury.

Current threats to these threatened vegetation communities in the LGA include:

- Clearing & Development
- Weed Species
- Fragmentation/isolation from other vegetation islands; and
- Changed fire regime

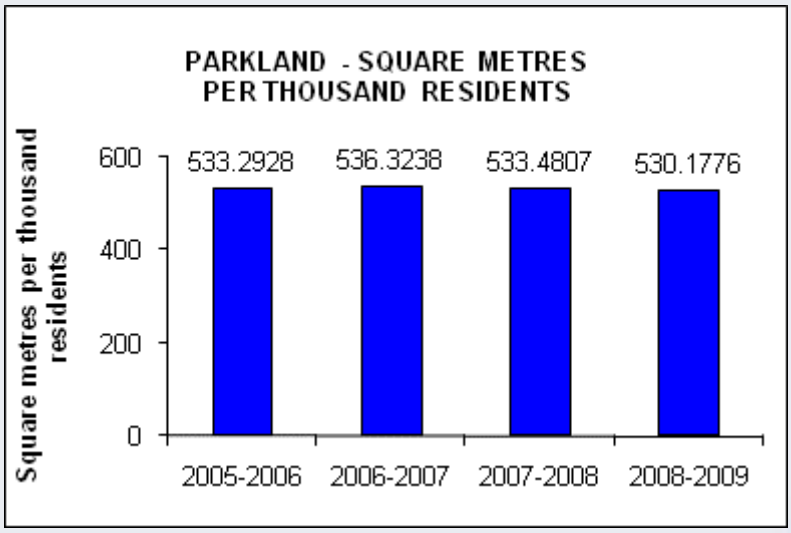
Measures of Performance

The performance is measured by the percentage of threatened species to native floral and faunal species found in the Local Government Area. However figures have been collated from information from the Wildlife Atlas website provided through Department of Environment, Climate Change and Water (DECCW).

Funding indicators are taken from previous budgets inclusive of grant funding.

Measure	**How is the Hawkesbury performing?**
1. Area of parkland per resident.	 There has been no significant change in area of parkland per resident between 2005-2006 and 2008-2009.

Current status and trends



Outcome 1

The amount of threatened species shows to have increased substantially between the latter years of the figures shown.

Many issues affect biodiversity within the Hawkesbury include:

- Land clearing - including illegal land clearing, clearing for development as well as clearing for bushfire protection
- Weed invasion - usually promoted by green waste being dumped in native bushland, garden escapees or spread by wind, water, animal vectors, birds and vehicles (including bikes). Invasion also occurs when nutrient loads from farming and residential practices encourage growth in stormwater areas. The weeds grow and overtake the native vegetation
- Feral Animals and fish including deer, fox, pig, rabbit, cat, mosquito fish, and carp. These often out compete native species or prey upon our native animals, causing long-term losses and a decrease in biodiversity
- Fire - too much fire, or in some cases infrequent fires may lead to a loss in biodiversity. If a fire occurs before a plant is able to mature and set seed, often there will be a loss of biodiversity. In other cases, fire is required to stimulate germination of plants that may have grown old and died. A fine balance is required
- Collection of firewood or bush rock - this disturbs habitat for native animals
- Edge effects - where bushland areas occur adjacent to other land uses such as grazing or development, there is often an area of degraded habitat, with the impact extending 50-60 metres into bushland. Edge effects are generally detrimental so the establishment and persistence of native species; and
- Grazing or frequent mowing - While many herb species and native grasses may survive a frequent mowing regime, they will not be able to set seed to spread or maintain their population. Over time, this tends to lead to loss of native species diversity.

A decrease in funding is also shown through the figures this includes funding for:

- Threatened species protection
- Weed management; and
- Protection of threatened ecological communities

Response to the issue

Currently Council seeks grants to implement bush regeneration works in reserves that have been identified as valuable in biodiversity and the community. Currently Council does have a budget for environmental weed control, but often it is insufficient to implement a wide range of strategies to achieve a holistic approach in land management.

Such issues that are often overlooked due to the limitation of funds include:

- Pest animal control
- Erosion remediation
- Control of noxious weeds
- Education of the community
- Proper waste management; and
- Fencing and barrier to site to prevent vandalism.

The land management role in Council currently spends approximately 40% of their allocated time in searching for grant funding to supplement the current budget. 50% of grants applied for are unsuccessful, which indicates that 20% of the land management hours are lost just applying for grants alone.

Future directions

Council has several Plans of Management still to implement. These will give direction in the management strategies that should be in place. Some reserves have vegetation management plans implemented. It is of future importance that all reserves identified with threatened species under go a vegetation management plan, if a Plan of Management has not been drafted or implemented.

Currently there is minimal time to be spent on devising and implementing plans for all reserves in the Hawkesbury. It has been identified that there is a need for land management to become less reliant on grants to be able to sufficiently manage the outdoor environmental issues in the Hawkesbury.

Protection of Threatened Ecological Communities

Introduction

According to Council's mapping system there are 23 threatened ecological communities out of 53 identified vegetation communities in the LGA. This includes one Critically Endangered Ecological Community - Blue Gum High Forest and one Vulnerable Ecological Community - Hanging Swamps.

Currently no decisions pertaining to Ecological communities are undertaken however, their presence or management issues may be included in plans of management.

Measures of Performance

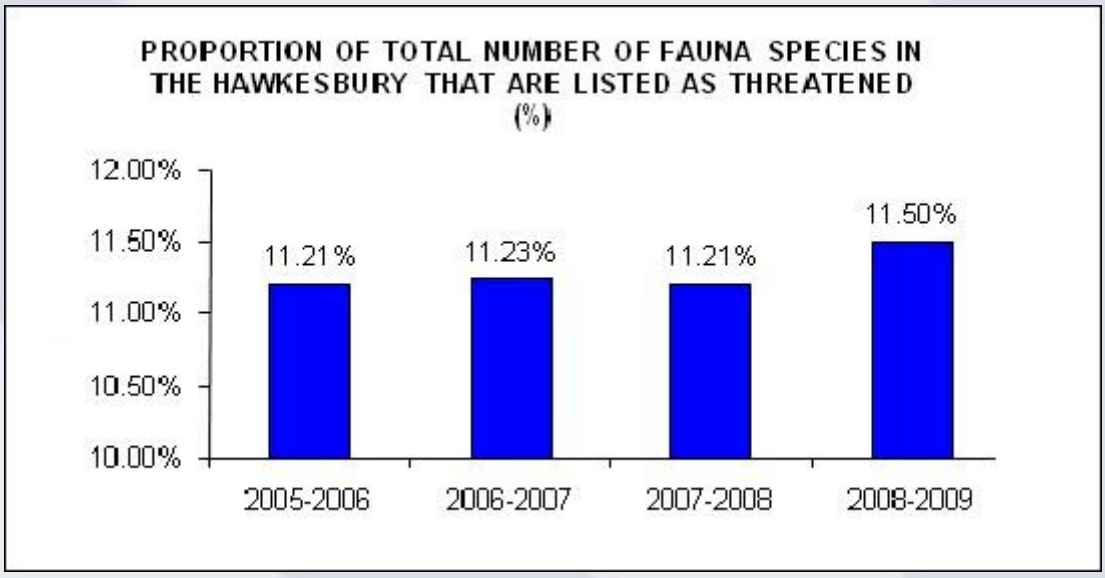
Measure

1. Proportion of total number of flora species in the Hawkesbury that are listed as threatened.
2. Proportion of total number of fauna species in the Hawkesbury that are listed as threatened.

How is the Hawkesbury performing?

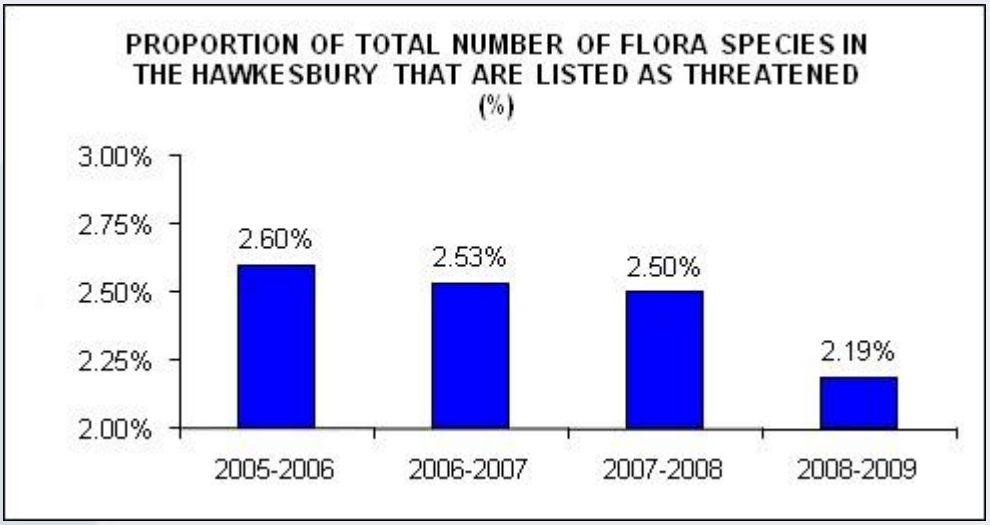
The number of threatened flora and fauna species in the Hawkesbury as a proportion of total species has remained relatively stable since 2005-2006.

Current status and trends



Outcome 1

Land Management currently manages threatened Ecological Communities. The bushland site with these communities are managed to bush regeneration best practices. However recovery of highly degraded bushland sites are not able to be properly addressed due to the minimal amount of funding received for all bushland reserves in the LGA.



Outcome 2

Response to the issue

A number of activities and initiatives include:

- Continued enforcement of the Hawkesbury Local Environment Plan 1989 that seeks to protect areas of threatened vegetation, provide a buffer around areas of ecological significance, protect environmentally sensitive land areas of high scenic value, and restrict development on land that is inappropriate for development by reasons of its physical characteristics or bushfire risk.

- The identification of areas of threatened species through completion and maintenance of vegetation maps; and

- Ongoing bush regeneration activities and the provision of funding to support regeneration projects.

Future directions

Some vegetation management plans and plans of management have not yet been implemented, however Council currently makes decisions in relation to reserve management in accordance with these plans. However, vegetation management plans should be derived and implemented in the future addressing the legislative requirements to management and protection of each particular vegetation community for best practice management.

Education of persons involved with decision making pertaining to Council land should also be implemented to identify and teach the importance and value of these ecosystems.

Estimation of pricings of each reserve should be identified in order to cost the approximate value of the reserves to the community, Council and other stakeholders. This will identify the necessary amount of money that should be spent on these reserves.

Staff will be involved in the assessment of significance of threatened species, or endangered population, to determine if impacts are likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

HAWKESBURY CITY COUNCIL

Aquatic and Terrestrial Weed Control

Introduction

Hawkesbury River County Council is a single purpose authority for the control of declared noxious weeds, and came into existence in 1948 (Government Gazette of 24//9/1948).

The Hawkesbury River County Council (HRCC) is responsible for the management of weeds in rivers and creeks, however is directly responsible for less than 3 kilometres of the 520 kilometres of the Hawkesbury/Nepean River.

As clearly defined in the Noxious Weeds Act 1993, private land owners and Government agencies are responsible for weed control on their land. This includes waterways.

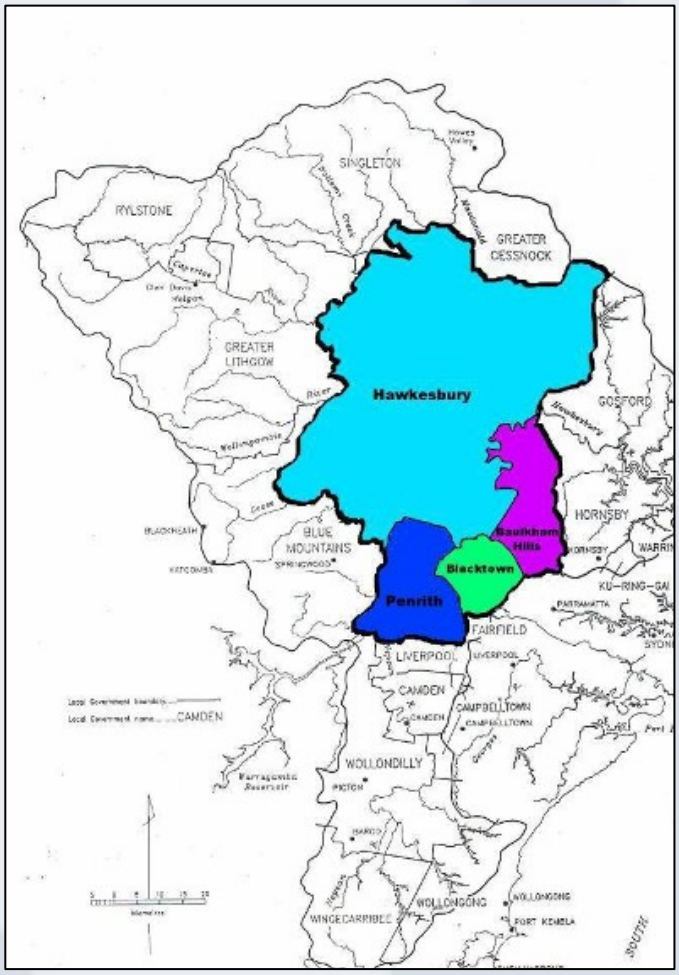
As presently constituted, the Council consists of the combined areas of the four constituent councils of Baulkham Hills Shire, Blacktown, Penrith and Hawkesbury Cities; a combined County area of 3,823 square kilometers.

Funds are provided by equal levies upon the four constituent councils. The State Government provides some grants and charges are made for services and work performed for private land holders.

As an organisation the County Council is constituted under the Local Government Act and is specified as a Local Control Authority under the Noxious Weeds Act. It is a special (single) purpose authority formed to administer, control and eradicate declared noxious weeds.

Noxious weeds are plants which are considered to be a threat to human and animal health, agricultural production, native landscapes or natural resources and must be controlled in accordance with the Noxious Weeds Act, 1993.

They are hard to eradicate, spread rapidly and may have toxic or harmful properties.



Weeds cost the Australian economy in excess of $3 billion annually. This figure does not include any costs weeds cause to human health, or the environment, both of which have recently been recognised as being greatly affected by weeds.

By law, noxious weeds must be controlled, and on private land the responsibility lies with the occupier of that land. Failure to take effective measures to control noxious plants in accordance with the prescribed categories may result in a fine.

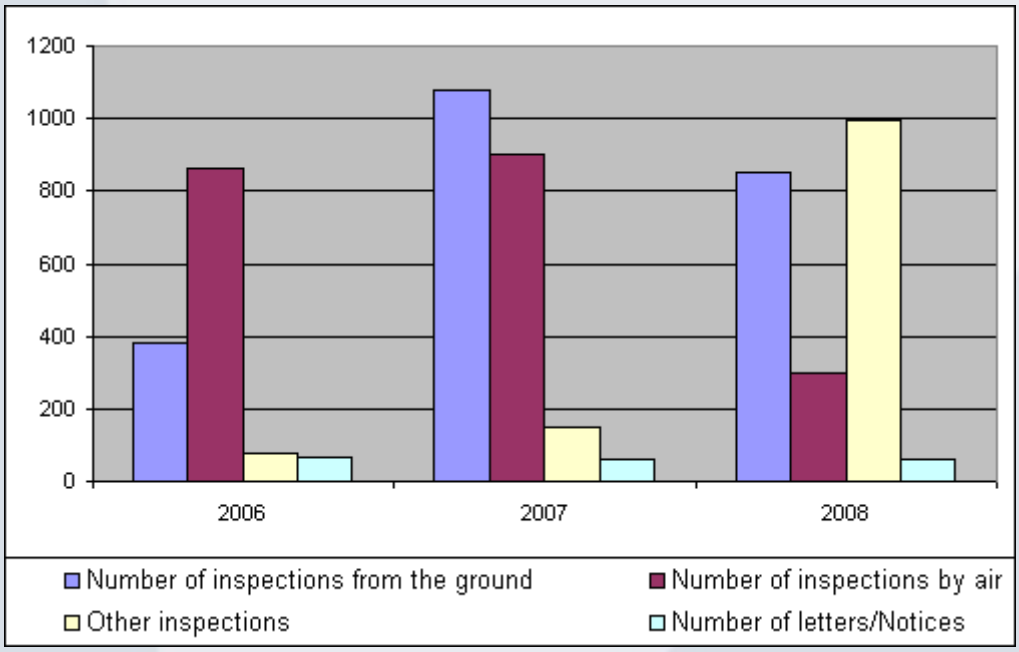
The status of current infestations of aquatic weeds is largely unknown. Knowledge in regards to aquatic weed management on Council land is limited.

Measures of Performance

Currently there are no performance indicators in regards to % of weed control or cleared. It has been suggested that an inquiry be held in regards to amount of time spent in the Hawkesbury.

As an organisation the County Council is constituted under the Local Government Act and is specified as a Local Control Authority under the Noxious Weeds Act. It is a special (single) purpose authority formed to administer, control and eradicate declared noxious weeds. Therefore is required to undertake inspections of land within the local area in connection with its noxious weed control functions;

Private property inspection program



Current status and trends

During 2005/2006 the number of actual ground inspections was down on previous years due to the heavy commitment for the control of Salvina on the Hawkesbury Nepean River, however the number of properties was increased. This was due to two helicopter surveillance flights being conducted rather than the usual one. This was to locate weed infested farm dams, creeks, water bodies and wetlands.

During 2006/07 the number of properties inspected from the air was considerably higher than previous years due to three helicopter surveillance flights.

During 2007/08 the number of properties inspected from the air was considerably less than previous years due to only 1 helicopter surveillance flight being conducted. In addition, the property inspection numbers were also down slightly due to a Weeds Inspectors resignation in September 2007.

The number of "other inspections", which includes inspections carried out on aquaria, pet shops and nurseries to ensure that they do not sell classified weeds. It is considered far more beneficial to Council and the community to resolve noxious weeds matters through negotiation and cooperation.

Response to the issue

Council has approached HRCC in terms of creating an alliance in weed management issues. It may be beneficial for Hawkesbury City Council to devise a noxious or aquatic weed management plan in the future, to be able work in conjunction with land management and Plans of Management.

Staff have participated in public awareness activities, they are as follows:

- Blacktown City Festival- Environment Expo
- Castle Hill Show
- Hawkesbury District Agricultural Show
- National Tree Day
- World Environment Day
- Aquatic Weed Expo- Yarramundi Reserve
- Tour of Inspection for Councillors, Memebers of Parliament and Government agency staff; and
- Western Sydney Bream & Bass Fishing Club

To comply with the changes to the Pesticides Act, Hawkesbury River County Council has been conducting nationally accredited "Chemcert", Training Courses for its constituent councils.

Extensive control works were carried out in 2006/2007 on Mother-of-Millions on Council lands, roads and reserves. This plant has occurred in alarming proportions in recent times and considerable effort has been employed in an attempt to curtail its spread any further

Biological controls have been released Cyrtobagous salviniae weevil for the past 10 years with very poor results prior to mass releases in 2004, 05 and 06. Results in 2007 show that the biological controls have been of benefit but is not the universal panacea that some may think. Success has been sporadic and varies widely depending on the situation. However success has proven to be sufficient to continue inclusion of the weevils in the integrated weed management plans.

Successful biological control programs will not eradicate a pest species, it can be very effective at substantially reducing populations, which may allow native species to return (or another pest to occupy the vacant niche). Used in an integrated approach with other control techniques, biological agents can stress target plants making them more susceptible to other control methods. Other Biological Controls include: Blue heliotrope, Tiger Pear, Common Pear, Water Hyacinth, and Alligator Weed.

A major issue with the management of Salvinia and Water Hyacinth in the lower reaches of the Hawkesbury/Nepean River is the influence of tidal activity and prevailing winds. These forces cause treated and untreated plants to intermingle making it necessary for repeated applications of herbicide over the same area.

The County Council was fortunate to acquire 29 x 15metre lengths of containment booms on loan from the Department of Primary Industries, these booms have proved invaluable in containing the Salvinia and Water Hyacinth to areas where it could be managed using herbicides or harvesting and preventing further spread downstream. With the exception of a few instances of vandalism or debris accumulation which allowed

Salvinia and Water Hyacinth to escape from behind the booms, their placement has been an overwhelming success.

The containment booms remain in place and are located at the following locations;

- South Creek X2
- Eastern Creek
- McKenzies Creek; and
- Tilmunda Quarry, Yarramundi

In 2006/2007 Hawkesbury River County Council received a Crown Lands grant and a grant from the Hawkesbury Nepean Catchment Management Trust to assist with the control of weeds on the riparian section of the Hawkesbury Nepean River, with particular emphasis on Yarramundi Reserve.

Terrestrial weed species treated consisted of several Salix species and their hybrids, predominately Black (S. nigra), Crack (S. fragilis) and Tortured (S. matsudana), Willow Primrose (Ludwigia peruviana), Lantana, Blackberry (Rubus fruiticosis) and Green Cestrum (Cestrum parqui).

Aquatic weeds which were present in the River and lagoons, Alligator Weed (Alternanthera philoxeroides), Salvinia (Salvinia molesta) and Water Hyacinth (Eichhornia crassipes) were treated at this time with funding from the Noxious Weeds Advisory Committee, and Council funding.

Nuisance vegetation, such as, Balloon Vine (Cardiospermum grandiflorum) was treated via the technique of skirting, which encompasses the use of herbicide sprayed in a band around the shroud of vegetation approximately one metre above ground level. This technique is essential to allow access to the trunks of targeted weed species for treatment and to remove the burden of the vegetation smothering remnant native species, such as River Oak (Casuarina cunninghamiana) and several wattle species (Acacia sp) which are needed to sustain bank integrity after weed treatment.

Future directions

Council is still concerned at the presence of Egaria densa in the Hawkesbury Nepean River, this plant is not declared noxious, however it has the capacity to cause serious infrastructure damage, displace native plants and alter the biodiversity of the river system. Due to the long dry period and low flows in the river the Egaria is becoming more and more a serious problem, however adequate funding to provide for alternative weed control methods for submerged weeds is required. Several meetings have initiated discussions through the Western Sydney/Blue Mountains Regional Weeds Committee as to future control possibilities.

The Hawkesbury River County Council is committed to preventing incursions of new weeds into the area and responds to reports of new weeds and takes the appropriate action.

Review of the current situation and the efficiency of the arrangement is necessary to be able to better communicate with HRCC in regards to weed management issues.

Stream Watch

Introduction

Streamwatch is an education and community awareness program run by Sydney Water and the Sydney Catchment Authority (SCA). Voluntary Streamwatch groups consisting of primary and secondary school students and adult community groups who test the water quality of their local waterways.

There are currently ten active Streamwatch groups in the Hawkesbury local government area (LGA). These are:

- Arndell Anglican College Streamwatch group
- Colo High School Streamwatch group
- Colo Valley Streamwatch group
- Freemans Reach Streamwatchers
- Glossodia Priority Sewage Project group
- Green Corps Streamwatch group
- Little Wheeny Streamwatch group
- MacDonald Valley Association
- Roberts Creek Streamwatch group; and
- South Creek Streamwatch group

These groups test at a number of sites throughout the Hawkesbury LGA including South Creek, Hawkesbury River, Colo River, MacDonald River, Little Wheeny Creek and Roberts Creek.

Measures of Performance

Results are sent to Sydney Water/SCA and verified by a Community Education Officer. Results are compared to the Australia and New Zealand Environment and Conservation Council's (ANZECC, 2000) water quality guidelines and if they do not meet these guidelines then further investigation is undertaken.

The groups regularly test for a number of parameters including dissolved oxygen, temperature, available phosphates, pH, salinity, faecal coliforms, turbidity and *E. coli*.

Community Education Officers train new groups and provide them with an instructional manual. Groups are retrained on an annual basis and new group members are trained as required.

Streamwatch undertakes an annual Quality Assurance Event where groups test mystery samples. Their results are compared with Sydney Water's West Ryde water laboratories results.

Current status and trends

Information on sites and data for the Hawkesbury can be view on the streamwatch web site under the North Western Sydney Region at www.streamwatch.org.au

Streamwatch awarded the South Creek Watchers "The Most Outstanding Community Group in NSW 2008" for their excellence in quality control of sampling.

Water sampling and field observations

Conducting water quality tests

HAWKESBURY CITY COUNCIL

Bushcare

Introduction

There are a total of 13 community volunteer Bushcare groups throughout the LGA. Generally these groups meet on a regular basis once a month on a weekend, at a regular time for approximately three hours. The main type of work that takes place is bushland regeneration. Weeds are removed from a bushland reserve that are negatively impacting on the natural diversity of the reserve, in a manner that minimises disturbance to the environment. This program works closely with the CMA's volunteer bush regeneration program, Landcare.

The areas that are worked throughout the LGA include; Kurrajong Heights, Kurrajong, Grose Wold, North Richmond, Ebenezer, Sackville, Glossodia, McGraths Hill, Lower MacDonald and St Albans. The Bushcare program is a national program in Australia that aims to provide training and support to environmental volunteers. Similar programs include; Coastcare, Dunecare, Landcare, Wetlandcare.

Volunteer programs regionally can suffer from lack of interest to the entire age spectrum, often older people are regular volunteers - this may pose an issue on OH&S and sustaining volunteer base. Finding selling point of volunteering to younger generations proves to be a stumbling block, and most Bushcare Officers are unable to devote the time to this sort of recruitment.

Local impacts on the program include; limited funding opportunities, time limitations on staff to further develop Bushcare volunteer numbers and create environmental awareness, vegetation dumping increases weed threats, illegal four wheel driving & vandalism through sites can set back progress of reserve and their potential to regenerate.

Measures of Performance

The Sydney Metro CMA facilitate quarterly meetings for what is known as a VCN, where all Government bodies meet that have a Bushcare program or similar. The Hawkesbury Bushcare model can be compared to other local councils within this network as every year a statistical report is produced.

Current status and trends

The Bushcare program has remained at a constant over the past years; with the maintenance of approximately 13 Bushcare Groups. For this to increase in volunteer numbers, a "volunteer drive / recruitment" would need to be implemented. An increase in Community Bushcare Officers would usually see a direct correlation in the increase in Bushcare volunteers. People can join the Bushcare program by joining an existing group, or possibly starting a new community Bushcare Group. The Bushcare program is advertised by a quarterly newsletter "Weed All About It". This newsletter is distributed throughout the LGA by Community Centres, Libraries, a mailout list, various government foyers in the LGA & the HCC website. People can join by contacting the Community Bushcare Officer 4560 4525, or filling in a registration available on the HCC website. Bushcare Groups meet on a regular monthly basis, usually for three hours each time.

Response to the issue

Various Bushcare Groups work in EECs undertaking bushland regeneration and are an integral part of the state and federal grant application process. Grant bodies request community involvement and participation at these sites and reserves and the community involvement is used as an "in-kind" contribution towards grants of which helps to boost funding for various projects and increases the probability of potential grants being successful.

In some cases Council reserves are maintained solely by the various Bushcare Groups and if the community group did not undertake this voluntary work, environmental work at these sites would not exist.

Future directions

The Bushcare Program in future if in its present state, volunteer numbers will remain the same, with some volunteers leaving, but new volunteers beginning. It is expected that future volunteer numbers may increase, due to the aging population and environmental issues becoming main stream. However with these two points of possible increase in volunteers, adequate staffing levels would be required to support the Bushcare Volunteers.

Above L-R: Some of The Hawkesbury Rainforest Members Vickii Lett, Garth Smith, Kate Young, Robin Woods, Ian McCewan, Brenda Smith, Pat O'Toole and Trish Butler, with Councillors, Wayne Wheelan and Mayor Bart Bassett.

The above picture was taken at the 2008 Bushcare Awards, with impressive support and involvement from a number of Councillors.

Hawkesbury Rainforest Network

Introduction

Hawkesbury Rainforest Network (HRN) is a registered Landcare group working in the Kurrajong-Grose Vale region, on private properties and along Little Wheeny Creek and its tributaries.

The group's objectives are to implement best practice restoration of native vegetation communities and streams on private and public lands. Many of these communities are listed under the Threatened Species Act NSW (1995) as Endangered Ecological Communities (EEC's) and include Western Sydney Dry Rainforest which is restricted to approximately one quarter of its former distribution, due to early land practices.

The endangered Eastern Macquarie Perch is also a focus of activities, being found in Little Wheeny Creek recently, and impacted by silt and pollution. The group carries out water monitoring at 6 sites along part of the Creek from Kurrajong Heights, and in future, plans to extend all the way to join up with Upper Colo River Landcare group

In all of these undertakings, the group operates collaboratively with all levels of government and various agencies, including Hawkesbury-Nepean Catchment Management Authority, Department of Environment, Climate Change and Water (NSW), Department of Environment, Water and Heritage (Aust), Department of Primary Industries (Fisheries); Hawkesbury City Council, University of Western Sydney and Richmond TAFE, as well as with other local Landcare and Bushcare groups.

The Networks major concerns for effective performance is to educate the local population about issues affecting their land management practices such as woody weed eradication and protection of the aquatic systems from pressures such as grazing, pollution and inappropriate use of chemicals and machinery. The immediate effects of climate change, such as drought and higher storm events are also of concern.

Measures of Performance

So far, documentation of plant species with recording and validation of several new records, has been taking place over the last ten years. Endangered Ecological Communities (EECs) identified in the area include Western Sydney Dry Rainforest (WSDR) Turpentine-Ironbark Forest and Shale-Sandstone Transition Forest, as well as Sydney Coastal River flat Forest. Hawkesbury Rainforest Network has nominated Western Sydney Dry Rainforest to be listed under the Environmental Protection and Biodiversity Conservation Act, (EPBC Act), and has received confirmation that it will be considered in 2010.
On-ground works have included: (up to August 09)

- Woody weed control: 300 hours
- Water testing: 264 hours
- Revegetation: 540 hours
- Nursery propagation: 180 hours
- Seed collection: 40 hours
- Vegetation recording and monitoring: 50 hours
- Training and educational workshops: 240 hours
- Lifestyle and Environment Forum: 300 hours

- Meetings with a range of consultants on flora and fauna issues: 200 hours
- Plants raised: 6000; and
- Plants planted: 2950

Current status and trends

HRN has grown since its formation in 1997, to approximately 80 financial members, but with a reach well beyond that.

Properties with EECs have received funding totalling over $100 000 through various grants.

HRN usually hold public meetings in Kurrajong village and events in local areas with selected speakers/ trainers/demonstrators on a large range of issues such as:

- Planning for restoration of bushland through site assessment, species identification, and weed control methods
- Education on protection of habitat for native fauna such as birds, frogs, Macquarie Perch, platypus, flying foxes: or eradication and control of feral species such as deer
- Bushwalks to reserves or onto participating properties for interpretive field work; and
- Regular work on roadside weed control, usually weekly.

Response to the issue

HRN has been involved to some degree on aspects of the following:

- Roadside vegetation management- in practical and planning terms especially in Kurrajong area on Old Bells Line of Rd to reduce privet impacts
- Creek bank protection and drainage control to reduce erosion and riparian weed impacts
- Feral animal control- especially in regard to deer impacts on native vegetation and revegetation works
- Bellbird Hill Reserve – plan of management, bush regeneration works, TAFE student studies; and
- Water quality – Council's water testing and monitoring operations.

Future directions

Hawkesbury Rainforest Network plans to assess vegetation health and weed impacts in Little Wheeny Creek downstream from the current area of activity towards Colo River.

Woody weed and exotic vine control strategies are also developing with the aim of education and implementation over a long-term to reduce effects on EECs and riparian zones.

References

HAWKESBURY CITY COUNCIL

Item
Allen Management Solutions Pty Limited and Hawkesbury City Council," Where is the Hawkesbury Heading?, River Summit , (13th August 2008) Summit Documentation.
Australian and New Zealand Environment and Conservation Council, State of the Environment Reporting Task Force 2000, *Core environmental indicators for reporting on the state of the environment*, Environment Australia, Canberra.
Commonwealth of Aust 2009, Climate Change Faster Change & More Serious Risks, Will Steffen
Commonwealth Scientific and Industrial Research Organisation ('CSIRO') Australia 200
Dataworks invoice from HRCC, HRCC SOE 2007/8
DECC's survey Who Cares about the Environment in 2006
Department Infrastructure, Planning and Natural Resources, "Urban Salinity in Western Sydney" 2007)
Department of Environment and Climate Change (June 2009) NSW Diffuse Source Water Pollution Strategy, State of NSW DECC.
Department of Environment and Climate Change NSW (2007), Waste Avoidance and Resource Recovery Strategy 2007, Department of Environment and Climate Change NSW, NSW
Department of Environment and Climate Change NSW (2009) Hawkesbury-Nepean River Environmental Monitoring Program (Final Technical Report).
Department of Environment and Climate Change NSW, "Learning for Sustainability- what it means for local government", NSW Environmental Education Plan 2007-2010.
Department of Environment and Conservation - visited on 1.09.09
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Engelhard, M. SOE 2008/09
Hawkesbury City Council 2009-2010 (2009) Hawkesbury City Council
Hawkesbury City Council Energy Savings Action Plan (September 2008)
Hawkesbury City Council Management Plan 2009-2010 (2009) Hawkesbury City Council.
Hawkesbury City Council, "Invitation to Stakeholders" (8th July 2008)
Hawkesbury-Nepean Flood Management Advisory Committee (November 1998), Achieving a Hawkesbury-Nepean Floodplain Management Strategy
http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/cma_home.aspx?name=Hawkesbury/Nepean
ICLEI, The Melbourne Principles for Sustainable Cities. Available on ICLEI website
Jack Brook (1994,1999) "Shut out from the World- The Hawkesbury Aborigines Reserve and Mission 1889-1946. Deerubbin Press
Lyndall Pickering | Water Efficiency Specialist Every Drop Counts Business Program | Sydney Water 1 Smith Street Parramatta NSW 2150 | PO Box 399 Parramatta NSW 2124

References

Item
New South Wales Government (April 2005), Floodplain Development Manual: the management of flood liable land
NSW Government CSIRO (2007) Climate Change in the Hawkesbury-Nepean Catchment.
Planet Footprint Pty Ltd (2008) Hawkesbury City Council Organisation Footprint- Greenhouse.
Project Manager, Merana Aboriginal Community Association for the Hawkesbury Inc. 96 Windsor Street, Richmond, NSW 2756
Salinity Working Party Minutes (Jan 2009) Hawkesbury City Council
Shaping our Future Hawkesbury Community Strategic Plan 2010-2030 (Consultation Draft 2009) Hawkesbury City Council.
Sustainability Planning for Hawkesbury City Council Final Report (2007) Institute for Sustainable Futures University of Technology Sydney.
Sustainability Planning For Hawkesbury City Council Final Report (2008) Institute for Sustainable Futures For Hawkesbury City Council.
The Climate Change Action Pack is available at www.lgsa-plus.net.au/ClimateChangeActionPack
The Hon Dr Mike Kelly AM MP,Parliamentary Secretary for Water, "$77m recovery package announced for Hawkesbury-Nepean River", Media release ,(20 May 2009), Ref: MK2/2009
The Local Government Managers Australia (LGMS) Sustainability Health Check (2006)
UNCED- United Nations Conference on Environment and Development (Rio do Janeiro, 3-14 June 1992)
www.wildlifeatlas.nsw.asp.au

Glossary

Term	Definition
ABS	Australian Bureau of Statistics
CMA	Catchment Management Authority
DECCW	Department of Environment Conservation, Climate Change and Water
Ecosystem	A natural area that has many organisms interrelating
EEC	Endangered Ecological Community
EEC's	Endageroued Ecologolcial Communities
EPBC	Environment Protection and Biodiversity Conservation Act
Fragmentation	Breaking up of large patches of ecosystems
HRCC	Hawkesbury River County Council
LGA	Local Government Area
Stakeholder	Organisations of persons who have an interest in land management issues
VCN	Volunteer Coordinators Network
WSDR	Western Sydney Dry Rainforest
WSROC	Western Sydney Regional Organisation of Councils Ltd

Appendix A

Energy Savings Actions by Site

Source: Energy Savings Action Plan Revised September 2008

Energy Savings Actions by Site

Site	Measure	Cost	Yearly Savings						
			KWh	MJ	Pk-kVA	$	CO2	Payback	Completion
Site name	Summary description, accompanied by supporting information in the associated report section	Upfront cost of measure	Electricity consumption	Gas consumption	Peak demand (electricity)	Dollar saving	Kg of CO2-e	Simple payback (in years)	Planned completion date
Deerubbin	Set-up net metering or electricity sale contract with energy provider to account for electricity generated by co-gen system	TBA	TBA			TBA		TBA	2010
Deerubbin	Resolve co-gen operational issues (with energy reduction a priority given the site's unusually high energy consumption)	TBA	TBA			TBA		TBA	2010
Deerubbin	Review electricity contract pricing (once co-gen equipment operation is resolved)	TBA	TBA			$20,000		TBA	2010
Deerubbin	Place the library's central up-lights on a light-sensor override (so thay are always off when sufficient day-lighting is available)	$1,500	7,008	0	0	$841	7,428	1.8	2008
Oasis	Automatic doors installed to minimise heat loss	$51,000	TBA			TBA	0	TBA	2008
Oasis	Reduce pool temperature set points by 1c (26-27C)	$0	50,000	250,000	0	$9,750	69,525	0.0	2008
Oasis	Install solar water heating system on available roof space	$90,000	100,000	500,000	0	$19,500	139,050	4.6	2012
Oasis	Install power factor correction equipment at this site	$14,000	0	0	53	$4,706	0	3.0	2009
Oasis	Install Variable Speed Drive's on main circulation pumps (eg 80% of usual flow rate over night)	$10,000	32,850	0	0	$3,942	34,821	2.5	2009

Site	Measure	Cost	Yearly Savings						
			KWh	MJ	Pk-kVA	$	CO2	Payback	Completion
Site name	Summary description, accompanied by supporting information in the associated report section	Upfront cost of measure	Electricity consumption	Gas consumption	Peak demand (electricity)	Dollar saving	Kg of CO2-e	Simple payback (in years)	Planned completion date
Oasis	Install lighting occupancy sensors in the aerobics room (note: additional opportunities may exist)	$1,000	1,752	0	0	$210	1,857	4.8	2009
Oasis	Replace kiosk halogen lighting with 20W IRC halogens	$100	1,533	0	0	$211	1,625	0.5	2008
Oasis	Investigate new low air replacement method for ventilation system (currently being implemented at Gosford Council)	$150,000	TBA			TBA	TBA	TBA	TBA
Streetlights	Replace all (~1,400) 80W mercury vapour lamps with twin T5 alternatives	$400,000	367,920	0	84	$51,610	389,995	7.8	2015
SWSTP	Completed - Soft starters installed on key equipment	TBA	TBA			TBA	TBA	TBA	Completed
SWSTP	Use dissolved oxygen (or other process-specific) sensors linked to VSD's for improved operation of blower motors	$30,000	48,000	0	0	$5,760	50,880	5.2	2010
SWSTP	Install power factor correction equipment at this site	$14,000	0	0	50	$4,440	0	3.2	2009
SWSTP	Set air conditioning in control room to minimum 24C-21C	$0	2,000	0	0	$240	2,120	0.0	2008
SWSTP	Install domestic heat pump how water system for amenities area	$2,500	2,920	0	2	$528	3,095	4.7	2010
SWSTP	Install Variable Speed Drives on other key variable-demand equipment	TBA	TBA			TBA		TBA	TBA
Admin	Upgrade of building's HVAC systems (8-12 reverse cycle units)	$350,000	TBA			TBA		TBA	Tender
Admin	Upgrade lighting in old Library (including de-lamping and day-lighting glare reduction)	$4,000	4,000	0	2	$658	4,240	6.1	2010

Site	Measure	Cost	Yearly Savings						
			KWh	MJ	Pk-kVA	$	CO2	Payback	Completion
Site name	Summary description, accompanied by supporting information in the associated report section	Upfront cost of measure	Electricity consumption	Gas consumption	Peak demand (electricity)	Dollar saving	Kg of CO2-e	Simple payback (in years)	Planned completion date
Admin	Targeted 4kW reduction in building standby (after-hours audit, install timing devices etc)	$3,000	17,600	0	0	$2,112	18,656	1.4	2009
Admin	Investigate and address irregular operation of power factor correction equipment	TBA	TBA			TBA		TBA	2008
Admin	Investigate opportunities for improved roof insulation in the administration building	TBA	TBA			TBA		TBA	2010
Admin	Investigate automatic controlled louvers in Main Atrium	TBA	TBA			TBA		TBA	2009
Pumps	Completed - Upgrade to more efficient units (some pump stations)	$15,000	TBA			TBA		TBA	Completed
Pumps	Investigate opportunities for further saving (including Variable Speed Drives)	TBA	TBA			TBA		TBA	TBA
Pumps	Ensure all pump stations are upgraded, as required to more efficient units	On going	TBA			TBA		TBA	TBA
MHSTP	Install Variable Speed Drives on irrigation pumps and aim to reduce operational flow-rate as much as possible	$10,000	26,400	0	0	$3,168	27,984	3.2	Completed
MHSTP	Install domestic heat pump hot water system for amenities area	$2,500	2,920	0	2	$350	3,095	7.1	2010
MHSTP	Investigate power factor correction equipment	TBA	TBA			TBA		TBA	TBA
MHSTP	Install light sensor equipment for agriculture shed and replace with energy efficient globes	$1,500	TBA			TBA		TBA	TBA

Site	Measure	Cost	Yearly Savings						
			KWh	MJ	Pk-kVA	$	CO2	Payback	Completion
Site name	Summary description, accompanied by supporting information in the associated report section	Upfront cost of measure	Electricity consumption	Gas consumption	Peak demand (electricity)	Dollar saving	Kg of CO2-e	Simple payback (in years)	Planned completion date
FireHQ	Insulate ceiling (minimum R3.5) and under floor (where accessible)	$7,000	9,125	0	0	$1,095	9,673	6.4	2010
FireHQ	Install domestic heat pump hot water system for building	$2,500	2,920	0	2	$350	3,095	7.1	2009
IndoorSport	Install energy efficient hi-bay replacements(~100 fittings)	$25,000	45,625	0	25	$5,475	48,363	4.6	Tender
IndoorSport	Install domestic heat pump hot water system for change rooms	$2,500	7,300	0	2	$876	7,738	2.9	2010
IndoorSport	Place non-perishable drinks fridges and vending machines on timer switches (off 11om to 7am)	$100	1,500	0	0	$180	1,590	0.6	Tender
IndoorSport	Carry out a lighting refit to all T5 LL MT Adaptor System	$35,806	61,466	0	0	$7,376	65,154	4.9	Tender
Depot	Install energy efficient hi-bay replacements (~ fittings)	$15,000	27,375	0	15	$3,285	29,018	4.6	2010
Depot	Carry out a lighting refit to a T5 LL MT adaptor System	$64,755	188,179	0	0	$22,581	199,470	2.9	2010

Note: The planned completion dates for individual projects have been categorised according to and proposed resource allocation. The projects with the largest payback in the shortest number of years will be completed first. Some projects have been completed or have gone out to tender at the time of printing and will be amended in further submissions.

Appendix B

Water Savings Actions by Site

Source: Water Savings Action Plan Revised September 2008

Oasis Aquatic Swimming Centre, Church Street South Windsor

Total Usage in kL	Quantity of BAI	KPI
43,800 (120.0kL/d)	1.112,175 visitors to the site per year	39L/person/day

Cost effective opportunities	Responsible Department	Cost to implement ($)	Annual Water Savings in kL	Annual Energy Savings in GJ	Cost Savings Water ($)	Cost Savings Other ($)	IRR (%)	Start Date	Completion Date
Installation of ongoing monitoring system. Investigate future reporting system (No of patrons)	Building Services/ YMCA	950 p.a	9,490		12,700		1000		2010
Replace faulty float valve with level sensor device and solenoid valve	Building Services /YMCA	30,000	14,600		19,500		68		2010
Purchase new pool blanket for outdoor pool	Building Services	85,000	10,000		11,000		13	31 Dec 07	2010
Potential Cost Effective Opportunities									
Installation of improved access points for entry to balance tanks, piping and other infrastructure for more effective maintenance checking	YMCA Building Services	4,000	900		1,000		25	31 Dec 07	TBA
Implement stormwater collection and reuse system	Building Services	TBA	TBA		TBA			TBA	TBA
Install sub meter on backwash line	Building Services	TBA						TBA	2010
Install pressure gauges on backwash equipment and backwash only when required	Building Services	1,500			TBA			TBA	2010
Investigate recycling of swimming pool backwash water. The project would involve establishing a system that uses filtration, flocculation, chemical dosing and desalinisation to recover 75 % of the backwash water	Infrastructure Services	200,00	18,250		22,000	8,000	15	31 Dec 07	2010

Council Administration Building & Commercial Offices, Corner George & Dight Street Windsor

Total Usage in kL	Quantity of BAI	KPI
7531	Building Foor Area m2	4,460m2

Cost effective opportunities	Responsible Department	Cost to implement ($)	Annual Water Savings in kL	Annual Energy Savings in GJ	Cost Savings Water ($)	Cost Savings Other ($)	IRR (%)	Start Date	Completion Date
Replace 2x existing showerheads with water efficient AAA rated showerheads	Building Services	60	7		7		12	1 Jan 07	31 Dec 07
Insert aerators/flow restrictors into 21x12 litre/minute taps across all area of the building	Building Services	600	418		424		71%	1 Jan 07	31 Dec 07
Potential Cost Effective Opportunities									
Replace 15x11 litre single flush toilets, with dual flush (6 litre/3 litre) toilets across Admin	Building Services	TBA	TBA		TBA			TBA	2010
Implement Storm water harvesting and storage system	Building Services	TBA	TBA		TBA			TBA	2010

Deerubbin Centre Precinct - Library, Art Gallery, Commercial Offices, Café, Peppercorn Aged Care Services Lot 50 George Street, Windsor

Total Usage in kL	Quantity of BAI	KPI
16,146kL/year (44.3kL/d)	137,605 patrons per year (377 patrons per day)	87L/patron/day

Cost effective opportunities	Responsible Department	Cost to implement ($)	Annual Water Savings in kL	Annual Energy Savings in GJ	Cost Savings Water ($)	Cost Savings Other ($)	IRR (%)	Start Date	Completion Date
Readjust urinal sensors in male toilets	Building Services	400	350		469		93%	31 Dec 07	31 Dec 08
Continuing use of the Permanent Monitoring System	Building Services	4,500	4562.5		6,100				2008
Insert aerators/flow restrictors into 8212 litre/minute taps within the Old Johnson Wing	Building Services	160	6				4%	1 Jan 07	31 Dec 07
Replace 4 x11 litre single flush toilets, with dual flush (6 litre/3litre) toilets within the Old Johnson Wing	Building Services	1,200	88		100		8%	1 Jan 07	31 Dec 07
Potential Cost Effective Opportunities									
Install a 20kL rainwater tank	Building Services	$40,000 plus installation							
Increase the TDS levels of the Cooling towers to 2000µS/cm...	Building Services	TBA			$50 p.a				
Converting these basins to 6L/min by installing an inline or end-of-line flow restrictor	Building Services	100							2010
Install sub metering	Building Services	8324						31 Dec 07	3 Mar 08
Investigate Water Harvesting and storage options	Building Services	TBA	TBA		TBA			TBA	

Richmond Swimming Pool, East Market Street Richmond

Total Usage in kL	Quantity of BAI	KPI
20,950	38,792 patrons	540L/person/annum

Cost effective opportunities	Responsible Department	Cost to implement ($)	Annual Water Savings in kL	Annual Energy Savings in GJ	Cost Savings Water ($)	Cost Savings Other ($)	IRR (%)	Start Date	Completion Date
Repair major leak	Parks and Recreation	1, 051, 000	16,571		22,180	3,000	83	10 June 08	Oct 08
Flow control amenities	Parks and Recreation	200	438		1195		604		2010
Repair amenity leak	Parks and Recreation	300	365		489		167		2009
Reduce meter size	Parks and Recreation	0			548				2010
Potential Cost Effective Opportunities									
Automatic make up system	Parks and Recreation	1,000				TBA			2008
Permanent monitoring system	Parks and Recreation	850/annum				TBA			2008
Investigate rainwater harvesting and storage options	Parks and Recreation	TBA				TBA			2010
Investigate the recycling of swimming pool backwash water. The project would involve establishing a system that uses filtration, flocculation, chemical dosing and desalinisation to recover 75 % of the backwash water	Infrastructure Services	200,00	18,250		22,000	8,000	15	31 Dec 07	2010

Administration Precinct

Total Usage in kL	Quantity of BAI	KPI
7531	4461m2	4.63L/m2 day

Cost effective opportunities	Responsible Department	Cost to implement ($)	Annual Water Savings in kL	Annual Energy Savings in GJ	Cost Savings Water ($)	Cost Savings Other ($)	IRR (%)	Start Date	Completion Date
Replace 2 x existing showerheads with water efficient AAA rated showerheads	Building Services	60	7		7		12	1 Jan 07	31 Dec 07
Insert aerators/flow restrictors into 21 x 12 litre/minute taps across all areas of the Administration Building	Building Services	600	418		424		71	1 Jan 07	31 Dec 07
Potential Cost Effective Opportunities									
Replace 15 x 11 litre single flush toilets, with dual flush (6 litre/3 litre) toilets across all area of the Administration Building	Building Services	4,500	662		672		15	1 Jan 07	31 Dec 07
Investigate storm water collection and reuse system -	Building Services	TBA							2009

McQuade Park

Total Usage in kL	Quantity of BAI	KPI
5274	83,200	0.063KL/m2/annum

Cost effective opportunities	Responsible Department	Cost to implement ($)	Annual Water Savings in kL	Annual Energy Savings in GJ	Cost Savings Water ($)	Cost Savings Other ($)	IRR (%)	Start Date	Completion Date
Replace 4 x existing showerheads with water efficient AAA rated showerheads	Building Services	60	7		11		12	1 Jan 09	31 Dec 09
Insert aerators/flow restrictors into 21 x 12 litre/minute taps	Building Services	600	418		424		71	1 Jan 09	31 Dec 09
Potential Cost Effective Opportunities									
Insert aerators/flow restrictors into 21 x 12 litre/minute taps	Building Services	600	418		424		71	1 Jan 09	31 Dec 09
Investigate leak detection	Infrastructure Services	TBA	1793		1,818		34	2009	2010

South Windsor Sewage Treatment Plant

Total Usage in kL	Quantity of BAI	KPI
4760	1465 Volume of sewerage processed	3249L/ML or sewage processed/day

Cost effective opportunities	Responsible Department	Cost to implement ($)	Annual Water Savings in kL	Annual Energy Savings in GJ	Cost Savings Water ($)	Cost Savings Other ($)	IRR (%)	Start Date	Completion Date
Replace 4 x showerheads with AAA rated models	Infrastructure Services	80	183		185		231	1 Jan 06	2008
Install system to use recycled effluent in truck wash	Infrastructure Services	TBA	1,825		1,850			1 Jan 06	2008
Potential Cost Effective opportunities									
Replace washing machine with new, more efficient model	Infrastructure Services	600	18		19		3	1 Jan 07	2009
Replace 3 x 11 litre single flush toilets, with dual flush (6 litre/3 litre) toilets	Infrastructure Services	900	47		48		5	1 Jan 07	2009
Insert aerators/flow restrictors into 8 x 12 litre/minute taps	Infrastructure Services	400	37		37		9	1 Jan 07	2009

Wilberforce Shops

Total Usage in kL	Quantity of BAI	KPI
3376	1344m2	6.88L/m2/day

Potential Cost effective opportunities	Responsible Department	Cost to implement ($)	Annual Water Savings in kL	Annual Energy Savings in GJ	Cost Savings Water ($)	Cost Savings Other ($)	IRR (%)	Start Date	Completion Date
Replace 3 x 11 litre single flush toilets, with dual flush (6 litre/3 litre) toilets	Infrastructure Services	900	47		48		5	TBA	2009
Implement storm water collection and reuse system for the nursery -	Infrastructure Services	TBA	TBA		TBA			TBA	2009

Companion Animal Shelter

Total Usage in kL	Quantity of BAI	KPI
2472	732m2	9.25L/m2/day

Potential Cost effective opportunities	Responsible Department	Cost to implement ($)	Annual Water Savings in kL	Annual Energy Savings in GJ	Cost Savings Water ($)	Cost Savings Other ($)	IRR (%)	Start Date	Completion Date
Investigate the use of recycled water to hose down enclosures.	TBA	TBA						2009	20010
Investigate the use of recycled water to launder dog blankets	TBA	TBA						2009	20010

Richmond Tennis Court

Total Usage in kL	Quantity of BAI	KPI
2472	732m2	9.25L/m2/day

Cost effective opportunities	Responsible Department	Cost to implement ($)	Annual Water Savings in kL	Annual Energy Savings in GJ	Cost Savings Water ($)	Cost Savings Other ($)	IRR (%)	Start Date	Completion Date
Insert aerators/flow restrictors into 4 x 12 liter/minute taps	Infrastructure Services	50	22		23		46	1 Jan 07	2010
Replace 4 x showerheads with AAA rated models	Infrastructure Services	80	47		48		60	1 Jan 07	2010
Potential Cost Effective opportunities									
Replace 6 x 11 liter single flush toilets, with dual flush (6 litre/3 litre) toilet	Infrastructure Services	5,000	210		96		5	1 Jan 07	2010
Investigate options for a new sprinkler/watering system.	Infrastructure Services	TBA						1 Jul 06	2010

Bosworth Street (Coles) Car park

Total Usage in kL	Quantity of BAI	KPI
1545	N/a	N/a

Possible Cost effective opportunities	Responsible Department	Cost to implement ($)	Annual Water Savings in kL	Annual Energy Savings in GJ	Cost Savings Water ($)	Cost Savings Other ($)	IRR (%)	Start Date	Completion Date
Pursue Bosworth Street water use issue	Currently obtaining legal advice	TBA			2,068			2006	TBA
Implement maintenance program	Coles Centre Management	TBA							TBA

Australiana Village Park

Total Usage in kL	Quantity of BAI	KPI
1436	11 ha	358L/ha/day

Possible Cost effective opportunities	Responsible Department	Cost to implement ($)	Annual Water Savings in kL	Annual Energy Savings in GJ	Cost Savings Water ($)	Cost Savings Other ($)	IRR (%)	Start Date	Completion Date
Turn off all water to the site at the mains, and implement a procedure for the turning on and off water by gardeners etc as required. Repair or remove all faulty fixtures	Infrastructure Services	100	1,170		1,200		1200	2009	2009
Investigate alternate fire control and turn off all water at main	Infrastructure Services	TBA	TBA		TBA				TBA
Replace 4 x showerheads with AAA rated models	Infrastructure Services	120	TBA		TBA				2010
Replace 6 x 11 litre single flush toilets, with dual flush (6 litre/3 litre) toilet	Infrastructure Services	5,000	TBA		TBA				2010

Note: The planned completion dates for individual projects will be categorised according to and resource allocation. The projects with the largest payback in the shortest number of years will be completed first. Some projects have been completed or out to tender at the time of printing and will be amended in further submissions.

Appendix C

Water Savings Actions by Site

Source: Water Savings Action Plan Revised September 2008

Noxious weeds list for Hawkesbury River County Council, effective as of 1st January 2009

The Noxious Weeds Act 1993 specifies five control classes for noxious weeds.

CLASS 1: State Prohibited Weeds. “The plant must be eradicated from the land and the land must be kept free of the plant.”

CLASS 2: Regionally Prohibited Weeds. “The plant must be eradicated from the land and the land must be kept free of the plant.”

CLASS 3: Regionally Controlled Weeds. “The plant must be fully and continuously suppressed and destroyed.”

CLASS 4: Locally Controlled Weeds. “The growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority.”

CLASS 5: Restricted Plants. “The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with.”

Common Name	Botanical Name	Class
Class 1		
Anchored Water Hyacinth	Eichhornia azurea	1
Black Knapweed	Cenraurea nigra	1
Broomrapes	Orobanche species except the native O. cernua variety australiana and O. minor	1
Chinese Violet	Asystasia gangeticassp micrantha	1
East Indian Hygrophila	Hygrophila polysperma	1
Eurasian Water Milfoil	Myriophyllum spicatum	1
Hawkweed	Hieracium spp.	1
Horsetail	Equisetum spp.	1
Hymenachne	Hymenachne amplexicaulis	1

Common Name	Botanical Name	Class
Karoo Thorn	Acacia karoo	1
Kochia	Kochia scoparia	1
Lagarosiphon	Lagarosiphon major	1
Mexican Feather Grass	Stipa tenuissima	1
Miconia	Miconia spp.	1
Mimosa	Mimosa pigra	1
Parthenium Weed	Parthenium hysterophorus	1
Pond Apple	Annona glabra	1
Prickly Acacia	Acacia nilotica	1
Rubbervine	Cryptostegia grandiflora	1
Senegal Tea Plant	Gymnocoronis spilanthoides	1
Siam Weed	Chromolaena odorata	1
Spotted Knapweed	Centaurea maculosa	1
Water Caltrop	Trapa spp	1
Water Lettuce	Pistia stratiotes	1
Water Soldier	Stratiotes aloides	1
Witchweed	Striga spp except native spp & S.parviflora	1
Yellow Burrhead	Limnocharis flava	1

Common Name	Botanical Name	Class
Class 2		
Hygrophila	Hygrophila costata	2
Class 3		
Alligator Weed	Alternanthera philoxeriodes	3
Giant Parramatta Grass	Sprorbulus indicus Var. major	3
Green Cestrum	Cestrum parqui	3
Ludwigia	Ludwigia peruviana	3
Mother of Millions	Bryophllum species and hybrids	3
Salvinia	Salvinia molesta	3
Water Hyacinth	Eichhornia crassipes	3
Class 4		
African Boxthorn	Lycium ferrocissimum	4
Blackberry	Rubus fruticosus (agg. spp.)	4
Californian/Cockle/Bathurst/Noogoora Burrs	Xanthium spp.	4
Chilean Needle Grass	Nassella neesiana	4
Columbus Grass	Sorghum x alumum	4
Crofton Weed	Ageratina adenophora	4
Johnson Grass	Sorghum halepense	4

Common Name	Botanical Name	Class
Harrisia Cactus	Harrisia species	4
Long-leaf Willow Primrose	Ludwigia longifolia	4
Pampas Grass	Cortaderia spp.	4
Paterson's Curse and Vipers/Italian Bugloss	Echium spp.	4
Pellitory	Parietaria judaica	4
Prickly Pear	Cylindopuntia species	4
Prickly Pear	Opuntia species except O. ficus-india	4
Privet (Broadleaf)	Ligustrum lucidum	4
Privet (Narrowleaf/Chinese)	Ligustrum sinense	4
Rhus Tree	Toxicodendron succedaneum	4
Serrated Tussock	Nassella trichotoma	4
Spiny Burrgrass	Cechrus incertus	4
Spiny Burrgrass	Cenchrus longispinis	4
St Johns Wort	Hypericum perforatum	4
Class 5		
African Feather Grass	Pennisetum macrourum	5
African Turnip Weed	Sisymbrium runcinatum	5
African Turnip Weed	Sisymbrium thellungii	5
Annual Ragweed	Ambrosia artemisifolia	5

Common Name	Botanical Name	Class
Arrowhead	Sagittaria montevidensis	5
Artichoke Thistle	Cynara cardunculus	5
Athel Tree/Athel Pine	Tamarix aphylla	5
Bridal Creeper	Asparagus asparagoides	5
Burr Ragweed	Ambrosia confertiflora	5
Cabomba	Cabomba spp.	5
Cayenne Snakeweed	Stachytarpheta cayennensis	5
Clockweed	Gaura lindheimeri	5
Clockweed	Gaura parviflora	5
Corn Sowthistle	Sonchus arvensis	5
Dodder	All Cuscata spp except the native species C. australis, C. tasmanica & C. victoriana.	5
Espartillo	Achnatherum brachychaetum	5
Fine-bristled Burr Grass	Cenchrus brownie	5
Fountain Grass	Pennisetum setaceum	5
Gallon's Curse	Cenchrus biflorus	5
Glaucous Star Thistle	Carthamus glaucus	5
Golden Thistle	Scolymus hispanicus	5
Lantana	Lantana species	5
Mexican Poppy	Argemone Mexicana	5

Common Name	Botanical Name	Class
Mossman River Grass	Cenchrus echinatus	5
Onion Grass	All Romulea species and varieties except R. rosea var. australis	5
Oxalis	All Oxalis species and varieties except the native species O. chnoodes, O. exilis, O. perennans, O. radicosa, O. rubens, and O. thompsoniae	5
Red Rice	Oryza rufipogon	5
Sagittaria	Sagittaria platyphylla	5
Sand Oat	Avena strigose	5
Smooth-stemmed Turnip	Brassica barrelieri ssp oxyrrhina	5
Soldier Thistle	Picnomon acarna	5
Texas Blueweed	Helianthus cillaris	5
Willows	Salixspp except S. babylonica, S. x reichardtii, S. x calodendron.	5
Yellow Nutgrass	Cyperus esculentus	5